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THEME:
Projects That Will Influence Instruction

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Projects That Will Influence Instruction

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Stephen M. Corey

Foundations and School Experimentation

Sharp is the line between the supporting of research and the promoting of a favored solution to an educational problem.

ONE conservative estimate of total philanthropic giving in the United States for 1959 is $7.4 billion. Gifts for education will probably constitute some 11 percent of this total or approximately $800 million. Estimating total expenditures for public and private education—elementary, secondary and higher—at $17 billion the fraction of that amount contributed by philanthropy might approximate one-twentieth.

So far as foundations are concerned, their gifts are expected to account for about 10 percent of total philanthropy for 1959, an estimated $700 million, give or take a few million.[1] There are between five and six thousand foundations—"non-governmental, non-profit organizations having a principal fund, managed by trustees or directors, and established to maintain or aid social, educational, charitable, religious or other activities serving the common welfare."[2] Seventy-seven of the big foundations account for about three-fourths of all foundation giving.

The largest of the general purpose foundations—the Ford Foundation, the Rockefeller Foundation, the Carnegie Corporation, the Alfred P. Sloan Foundation, the W. K. Kellogg Foundation, and a few others—are the ones whose influence on public education is best known and most often debated, in a muted fashion. Criticizing the large general foundations active in education does not promise much reward. If either the critic or the institution he is connected with has not received favorable action in his or its applications for grants the rejoinder to the criticisms is a bit too easy. If generous grants have been made the impulse to criticize foundation procedures or aims is weak.

This brief statement preceding a description of a number of specific foundation supported educational activities is intended to be critical. The annual foundation reports should be read by anyone interested primarily in the

[1] These data are from "Giving U.S.A." American Association of Fund-raising Counsel, Inc., New York, N.Y. 1958. 47 p.

[2] *Ibid.*, p. 38.

brighter side. These reports are professionally written, expensively printed, comprehensive and almost irresistably optimistic about accomplishments.

A Complex Task

Before commenting on the role of foundations in improving education I want to stress the fact that trying to improve education is much more complex and fraught with ideological and other types of controversy than trying to improve health. That small group, if it exists, that does not want to reduce the incidence of syphilis or tuberculosis can safely be neglected by foundation officials. Very few issues in education, however, are so one sided. For a large foundation to use its resources to promote or demonstrate a particular solution to a highly controversial social or educational problem is, I believe, bad foundation policy as well as bad public policy.

We do not yet know enough, for example, to warrant a decision by foundation officials that reading great books is the best road for adults to a general education, or that a fifth year of professional training and internship is the best preparation for teaching, or that Dr. Conant's 21 specific recommendations for the improvement of American high schools are just what the people need or that teacher aides are the solution to the teacher shortage.

The problems to which these presumed solutions apply are complex ones. For foundations to support research and experimentation in relation to them is most desirable. This research and experimentation should, of course, be directed by the widely accepted operational procedures that permit a line to be drawn between research and inquiry, on the one hand, and propaganda, promotion or demonstration, on the other.

I have a feeling that this point of view is accepted consciously and overtly by most foundation officials but the forces that operate on all of us to make us impatient with the slow progress of research and experimentation in respect to the solution of social problems have proved to be irresistible to some. This seems to me to be especially noticeable in recent years. I have no substantial body of data to support the inference but my impression is that the past decade has brought many indications of a new hunger on the part of large philanthropic foundations for newspaper and popular magazine publicity. This publicity will rarely be forthcoming from the unobtrusive announcement that a certain group of investigators distinguished to their peers but unknown to the general public has been given so many hundreds of thousands of dollars to investigate the relationship between class size and educational outcomes. A foundation official, on the other hand, can have a bang-up press conference to hear him report on an anticipated *solution* to the class size problem as a consequence of a grant to "experiment" with a "teaching by tape" procedure.

If my impression is well founded—my impression that foundations are increasingly confusing "experimentation" and "study" with propaganda and demonstrations—it may suggest a variation of Gresham's law that might be stated somewhat as follows: "The least desirable foundation policies in respect to seeking publicity and making unwar-

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ranted claims and promoting favored 'solutions' to complex educational problems tend to inhibit the practice of policies more clearly in the public interest."

As I have said, for foundations to support research and experimentation in relation to pressing educational problems seems highly desirable as policy. Conducting experimentation to determine the relative effects of different instructional methods or materials or classroom organizations is, however, a difficult and demanding activity. Especially is this the case if substantial generalizations of wide applicability are expected to result. Predicting the results of such experimentation, announcing a "breakthrough" in advance, for example, is completely contrary to the spirit of experimental inquiry. Furthermore, this "calling the shots in advance" approach to investigation puts great pressure upon the investigators to have the predictions materialize. This, I hasten to add, is more closely related to prudence, of a sort, than to dishonesty.

The necessity for careful advance design of pedagogical experimentation is so generally understood by qualified educational researchers as ordinarily to be assumed. A clear and precise statement of the specific changes expected to be brought about by any specific experimental "treatment" is essential for careful inquiry. So is a meticulous description of the new procedures so that whatever different effects are observed can conceivably be related to their "causes."

Arrangements for procuring reliable and valid evidence to determine whether or not the anticipated changes have occurred must be an integral part of the experimental design. To launch some new or renamed or modified program of instructional or training activities or instructional materials with great fanfare and exuberance and later on ask help from a "panel of experts" to evaluate the program seems to be an odd mixture of zeal for quick results, hunger for publicity, a desire for "breakthrough" credit accompanied by a weak and delayed recognition that someone is asking for genuine evidence of results.

The 206-page and as yet unpublished evaluation of the Arkansas Experiment in Teacher Education is, in my judgment, one of the most careful and objective attempts to dig out data *ex post facto* to determine whether or not a widely publicized and generously financed (more than 3 million dollars) foundation "experiment" accomplished its aims. The problems faced by the evaluation staff because the experiment was not designed as a true experiment, with the procuring of data on effects a built-in part of the design, would have frustrated completely an evaluation group of lesser creativity and ability to improvise and adapt. The directors of this evaluation, Willard B. Spaulding and David R. Krathwohl, make some exceedingly sobering inferences from the evidence they did get. This was in addition to making clear, at least by implication, their bafflement at the task of trying to test inadequately formulated hypotheses with whatever data could be brought to hand months and even years later.

The evaluation staff was especially interested in the consequences when foundation funds and a foundation supported organization try to bring about state-wide changes in an activity as complex as teacher education. The central inference was (p. 178-79) that whenever funds or an organization, in this case a federation of colleges, contribute to *aims already valued and striven for* by individual institutions, change and improvement are facilitated. When this congru-

(Continued on page 175)

Claudia Lewis
and Charlotte B. Winsor

Supervising The Beginning Teacher

Described here is an attempt to reduce the period of student teaching by a supervised work-study plan.

FOR 27 years Bank Street College of Education has been preparing liberal arts college graduates for nursery and elementary teaching, in a one-year course of intensive graduate study. The premise has been that personal maturity together with a disciplined educational experience are proper requisites for competent creative teaching. The program has, of course, undergone many changes since its inception in the early '30's, but none of these has been more far-reaching in implications than the recent revisions undertaken as a result of the growing teacher shortage and the "great debate" in education, often most directly related to teacher education.

About five years ago, Bank Street College—along with other teacher training institutions in this area—came face to face with this urgent social-educational problem: Is there a way to put more teachers into elementary classrooms sooner without the loss of effective learning for teachers?

"Is teacher education necessary at all?" is a cry heard all about us. For school people the answer is a resounding "yes" but a soul-searching examination of method may be in order. The outlines of a new training plan began to take shape in our thinking. Could we reduce the period of student teaching and offer qualified candidates the opportunity to teach *under our supervision* in a combined work-study plan within the year of training? We knew that supervision on the job is the usual pattern in the allied professions of social work and medicine. There was no doubt in our minds of the often desperate need for support from the training institution, experienced by new young teachers in their first days in the classroom. We had long been convinced, also, that two semesters of student teaching, for some students, represented a questionable postponement of the assumption of teaching responsibility. Our students, it must be remembered, come to us as graduates of liberal arts colleges and are more mature, better educated, and more highly

Claudia Lewis *is professor of education and* **Charlotte B. Winsor** *is director of teacher education at the Bank Street College of Education, New York, New York.*

motivated than the usual student entering a four-year teacher training program.

Aims of the Project

In the fall of 1955 we were able to initiate an experimental training program with the support of a grant from the Ford Fund for the Advancement of Education. Our purpose was threefold: (a) to experiment with a plan involving in-service supervision for beginning teachers, with relative reduction of preservice training; (b) to evaluate the results; and (c) to introduce changes gradually into our total program, so that we could eventually be in position to offer a variety of training programs suited to the increasing variety of individual talents, experiences and needs of our students.

Our practical task, as we inducted 12 students into the experimental program in the fall of 1955, was to find a way, in the course of one academic year, to give teachers in training an opportunity to experience the whole range of the process of becoming a teacher. Entering in the fall as novice students without previous teaching experience, they ended in the spring as teachers carrying full responsibility under our supervision. The question was essentially this: Could we locate the most advantageous cut-off point in training?

The program at the college included a fall semester of intensive course work and student teaching under the supervision of an adviser who worked closely with each student not only in the classroom but in individual guidance conferences. In addition, weekly group conferences were held for the students, for free discussion of problems, feelings, questions, and special interests. In the spring semester, the students were placed in full-time jobs, a majority of them in elementary classrooms in the New York City public schools. The adviser became the classroom supervisor on the job, at the same time continuing her personal guidance and leading the group conferences as during the first semester. Course work was completed during the spring and the summer semesters.

There was no expectation that the students should complete their Master's projects during this intensive year. For all students at Bank Street College, a three-year period is permitted for completion of the project.

Role of Adviser

The advantages of the experimental program were obvious from the start. The adviser, visiting and helping in the classroom, was often able to spot at once the sources of those initial difficulties that almost always beset the novice teacher who hesitates to admit need for help to the supervisor for fear that failure is announced thereby. For instance, the supervisor could suggest simple details of room arrangement and teaching techniques which made for more efficient management and more constructive work. She could help the teacher adjust her curriculum to the age level and the experience and needs of the children there before her in the class—for rarely does a new teacher find herself with a group of children who are comparable in every way to those she has worked with as a student teacher.

Most important, the adviser was in a strategic position to continue her personal guidance, and to help the student master the problems of classroom control stemming from her own uncertainties, her lack of confidence and experience in carrying the adult authority role in relation to young children. Again and again

in the course of our work we were impressed by the fact that teaching does indeed demand a great deal of maturity at a stage when young teachers are not yet completely mature adults. Just out of college, just beginning to establish their own independence, these young women are in a transition period in their lives, and their problems as authorities with children can be legion. The adviser, through her personal relationship, could often help the student teacher toward a better grasp and resolution of such problems.

Our basic aim, and that of our students, was to get on as quickly as possible with the real business of teaching, which is curriculum development—a business which can be gravely impeded if a novice teacher has to struggle along alone to learn the ways of classroom management. Our supervision in the classroom by no means worked a magic which made expert teachers of our novices overnight. Indeed, many of our students were struggling with classroom conditions which would have seriously challenged the most seasoned teacher. But in spite of such struggles, and in spite of the inevitable failures and difficulties involved in taking first steps, our students proved able to plunge into *teaching* in ways that impressed their school principals. No one of our experimental group of students was content simply with "good management" as something apart from curriculum and meaningful relationships with the children. All made efforts to bring really rich programs into their classrooms and to stimulate learning through appropriate materials. Even the two students who had the least degree of success with their classroom controls attempted trips and projects of which more skillful teachers might have been proud.

Evaluation

The self-evaluative statement made by one of our students at the end of her semester of supervision on the job reveals how well she had in this short time come to see what teaching is all about, and how well she had worked with her adviser toward improving her skills and broadening her goals. Actually, at the time of writing, she was already a competent teacher. It was heartening to us to see with what courage and zest she was envisioning her further development:

> When I began teaching, my curriculum wasn't always suited to the children and was much too rigid and teacher-imposed. I think I need to work very hard on ways of meeting individual needs through curriculum as well as personal relationships with group and individual. I need to know a great deal more about the inner workings peculiar to the different age levels and how to meet interests of a given group in terms of curriculum that will teach them not because they *have* to learn, but because they *want* to learn. . . . I need to relax and treat children the way I really think about them—as people, and never as threats. . . . Basically, I need what most of us beginning teachers need—the confidence that is required to give more, try more, and be more effective.

We are convinced that our students were able to develop in this way, holding onto their ideals and deepening their goals, partially because of the support we were able to give them in those first critical months when a beginning teacher hits the hard realities of the classroom. Often she finds that the ideals she carries with her from her training institution simply cannot be put into practice in her particular school. With understanding supervision, she can be helped to reorganize her values, rather than discard

them. Also helpful to our students at this crucial time were the weekly group conferences at the college, where there could be free sharing of feelings and dilemmas with peers. These sessions needed skillful guidance to keep students from group intoxication with difficulties. Constantly the question to return to was: What can you do about this in *your* classroom? How can you make the program (curriculum content) work for you as an organizing element in classroom climate?

How did our supervision differ from that of the principal or Board of Education supervisor in the school system itself? It supplemented without supplanting; it offered what the best-intentioned principal could not offer, because its dynamic was of another order. A principal must be on the side of his school and the school system; his relation to his teachers inevitably includes evaluative, ranking components. The advisers from the training institution, on the other hand, develop from the very beginning a relation with the students which is supportive, nonjudgmental, and evaluative only in the sense that evaluations of performance are arrived at through a joint process of work on problems. The recent introduction in some of the New York City schools of the "helping teacher" to work both with students and beginning teachers may represent a recognition of the productiveness of the nonjudgmental type of supervision.

Influence of the Program

Thus far we have emphasized the advantages of our supervision-on-the-job program to the novice teacher herself. The advantages to the training institution are similarly tremendous. Advisers who go to the grass roots of classroom situations are in a position to see the needs of the students at firsthand, and can avoid the pitfalls of theoretical formulations that lack a realistic basis. As a matter of fact, as a result of this experiment in training, our program at the college has been greatly revised. We have introduced new courses, new emphases in the basic child development and curriculum courses, new experiences in student teaching placements.

It would be a mistake, however, to imply that we did not face many dilemmas in connection with the experimental program, and are not still facing them in the program of supervision on the job which has now become one of our regular offerings. In the first place, there is the dilemma of selection, early in the training program, of those students most likely to succeed in the role of teachers by midyear, at the same time not to invest such a selection with the aura of honors. The faculty advisers feel strongly that for some students of outstanding ability the longer, slower process of preparation is nevertheless indicated. Sensitive communication is called for and not easily accomplished. Then there is the dilemma of job placement, especially for those students who enter in September and are ready to teach in February. The positions open in February are often the least desirable, and it has become only too clear to us that placement in a difficult classroom gives the novice teacher only half a chance to master her skills and put her ideas into practice.

Confronted with the needs of the novice teacher to "get through the day," to be momentarily competent, the training institution can easily err on the side of equipping the teacher with methods and skills—since she is going to need them so soon—at the expense of educating her toward an understanding of the teaching-learning process in depth. We are con-

vinced that the student profits in both the short and the long run if she is not short-changed in those aspects of the college program which give her a fundamental point of view about children and their needs. The comments of students themselves—some of them young women whose early days of teaching under our supervision were full of stress—bear testimony to this: "The Bank Street program gave me an attitude towards children and their development which is basic; gave me a more knowing approach into the meaning of behavior than I see in my colleagues." ". . . Bank Street gave me a good over-all view; I know what I am doing and why."

But how does one strike such a balance? The problem of finding the most effective material experiences and relationships to offer students in this program remains our challenge. Indeed the questions which have been raised by this program are no doubt significant to the whole field of supervision and curriculum development. Childhood and teacher education will benefit from further study of such basic problems.

The Reminder

When the day finally ended I felt wet and cold
And hungry and tired for a drizzling rain had begun
While I was plowing that drove me in from the field,
The overcast brought the dark early with no setting sun.

It wasn't a storm, there was no thumping anger from clouds,
But the slate colored light oppressed me and after the chores
I was glad to come into the house and shed my wet clothes,
I was glad to be warm at the fire and not out of doors.

The house smelled of love in the loaves of newly baked bread,
And my wife when I kissed her snuggled my hands to her breast,
When like a cry from the world, far off in the night
We heard a train whistle, wailing, sad and distressed.

It was nothing for us and yet we were painfully stirred
By the thought of our comfort, our house on earth of our own,
And still be reminded of all who are homeless tonight,
Of the soldiers and prisoners and outcasts who cannot go home.

—James Hearst, *Cedar Falls, Iowa*

Editor's Note: James Hearst, author of this poem and of two that appeared in the October issue, is a member of the English staff of the Iowa State Teachers College, Cedar Falls, Iowa. He also does part-time farming, maintaining his interest in the farm life which he knew as a boy.

A committee works to improve preparation and certification of English teachers.

Eugene E. Slaughter

Improving English Teaching

A GOOD English teacher for every girl and boy in school is the aim of the committee on preparation and certification of the National Council of Teachers of English. Means of attaining the aim is stated in the committee's assigned function: To assemble and make available for the use of interested persons information relevant to the improvement of standards for preparation and certification of teachers of English. Points of principal interest are the role of the English teacher and the enforcement of certification requirements which ensure that the teacher who is assigned is well qualified for the role.[1]

For the past five years the committee has considered these points against a background of other matters. As for all teachers, so for teachers of English, there are general professional roles. There are procedures such as selection of teacher candidates, development of an institution's program of teacher education, approval of the program and accreditation of the institution by responsible agencies, an institution's recommendation of its graduates who seek teacher certificates, issuance of certificates, employment and assignment of teachers by administrative officers, and enforcement measures.

Mutual Responsibility

The committee agrees with a consensus of the profession that in formulation of policy regarding these matters everyone having an interest should be represented equitably. Interested persons and groups are school boards, elementary, high

[1] Members of the NCTE committee on preparation and certification of teachers of English are Agnes V. Boner, Montana State University; Richard Braddock, State University of Iowa; Howard O. Brogan, Bowling Green State University, Ohio; Marie D. Bryan, University of Maryland; John Cowley, Iowa State Teachers College, Cedar Falls; John H. Fisher, Duke University; John McKiernan, on leave in Ireland; Karl W. Dykema, Youngstown University, Ohio, associate chairman; Eugene E. Slaughter, Southeastern Oklahoma State College, chairman, 1958-60; A. K. Stevens, University of Michigan; Margaret Ann Thomas, Hackensack, New Jersey; Donald R. Tuttle, Fenn College, Cleveland, chairman 1955-57, consultant 1958-60; Vern Wagner, Wayne State University, Detroit; Autrey Nell Wiley, Texas Woman's University. Former members are Peter Donchian, Wayne State University; William J. Dusel, San Jose State College, California; Foster B. Gresham, Longwood College, Virginia; Robert W. Rogers, University of Illinois; Eugene E. Seubert, Washington University, Missouri; Emerson Shuck, Bowling Green State University, Ohio.

school, and college teachers, their professional societies, academic and professional education departments, state education authorities, professional accrediting agencies, and administrative officers of schools and colleges.[2] Since the trend is from legislative prescription and administrative order toward cooperative process, it is urgent that all persons and groups assume their responsibility.

With the support of the NCTE, the committee has insisted that English teachers participate in selection, preparation, certification and accreditation whenever English teacher candidates or teachers are concerned. This would apply within the preparing institutions, on both the state and national commissions and councils, in their committees on standards and teacher education programs, and on their evaluating teams. In order to share in the over-all professional effort to improve standards, members of the committee have represented the NCTE at meetings of the National Commission on Teacher Education and Professional Standards and of the Council on Cooperation in Teacher Education. They have also engaged in discussions intended to provide a balanced participation in the National Council for Accreditation of Teacher Education by representatives of professional education and the academic disciplines.

English as a discipline and a profession with a unique responsibility has been tending to fall apart. There is a widespread opinion that anyone who uses English can teach it. The opinion is true in the sense that teachers of the natural sciences, the social sciences, the practical arts, and the fine arts are obliged to teach their students to use the language and writings that belong to their art or science. It is also true that all teachers should work for a common literacy. But in another sense language and literature constitute a discipline for which a specialist is needed. Besides a practical understanding of the form and use of English which, under expert supervision, may develop into the fine arts of speaking and writing, students need an organized knowledge of the language and an understanding of the relation between life, or reality, and imaginative literature, together with a notion of literary form and structure. The general and humanistic knowledge and uses of the English language, including literature in English, require professional attention.

The professional role of English teacher is hard to define. It is real, nevertheless, and it requires, in the committee's opinion, an intense and broad interest in life, literature and language; considerable understanding and expertness in these matters; appreciation of the values in life, which literature reveals and clarifies; proficiency in the arts of thinking, speaking, reading and writing; affection for boys and girls, a knowledge of how they learn, and a desire to teach them the values and the arts which can be learned through the study of the English language and its literature.

Requirements

Preparation for the role of English teacher, the committee believes, is a liberal and professional education with a concentration on language, literature, and related fields. The NCTE has not

[2] "Report of Sixteenth CCTE Annual Meeting, 1957." Council on Cooperation in Teacher Education. Washington, D. C.: American Council on Education, 1958.

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endorsed a specific program of courses for preparing teachers of English. It has, however, produced a series of related studies [3] and has defined a minimum college preparation in English for the high school English teacher. Upon recommendation of the committee, the NCTE board of directors in 1957 declared that every teacher of English in an accredited high school should have, as a part of his college preparation, *not less than* 24 semester hours in English, in addition to freshman composition and a course in methods of teaching English, and including courses in the scientific study of the English language, advanced composition, and English and American literature.

This resolution specifically provided that teachers in core curriculum programs which combine English with another subject should meet the minimum requirement for preparation in English. It stated further that even the smallest secondary school should have at least one teacher of English with a collegiate major in English to provide leadership in curriculum planning, text selection, teaching methods, and in-service training, and to set an example of competent teaching for those with minimal preparation.

The committee's opinion is not that college credit necessarily makes a good English teacher, but that at present the best (in fact, almost the only) available indicator of minimum proficiency in English is a major concentration as part of the degree program of an accredited college or university. When taken as a planned major, the English preparation will ordinarily include a significant and appropriate choice of courses designed to give the student the essential knowledge and uses of the English language and literature. Besides having too little college English, the teacher of English who has less than 24 semester hours in the subject usually accumulated his few hours without faculty counsel or a personal plan.

State requirements for teacher certification are quantitative and qualitative. Generally, state agencies declare the need of all teachers to receive a liberal education with one or more concentrations in subjects to be taught, together with a professional education that includes the psychological and sociological foundations of the teaching-learning process, teaching methods, and student teaching. Of the 50 states, 39 require a bachelor's degree for an elementary certificate; 49 require the bachelor's degree, and two the master's besides, for the initial secondary certificate.[4] More than half the states have specifications concerning health, age, United States citizenship, and loyalty oath.

Ordinarily, states consider quality by requiring portions of the total preparation to be in courses designed to develop special competencies. Some states use proficiency examinations as a substitute for a prescribed course or as a means of qualifying in an area that the teacher candidate has not included in his college preparation. A very few states require the candidate to make a designated score on a standardized national teacher examination in order to receive a certifi-

[3] See especially three volumes of NCTE curriculum series: (I) *The English Language Arts*, (II) *Language Arts for Today's Children*, and (III) *English Language Arts in the Secondary School*, all New York: Appleton-Century-Crofts, Inc.

[4] Here and later, data on certification and teacher education programs have been drawn largely from *Working Papers for Participants in the Kansas Conference*, Washington, D. C.: National Commission on Teacher Education and Professional Standards, National Education Association, 1959. p. 3-30.

cate; other states encourage him to include such a score in his personnel file; still others require for renewal of a certificate that he pass a locally prepared examination or submit a minimum of additional college credit.

Quantitative requirements in semester hours, as set by the states for an elementary certificate that is based on a bachelor's degree, range from 16 to 36, with the median 21, in professional education (*excluding* professionalized subject matter); range from 16 to 104, median 45, in general education. Similar requirements for a secondary certificate range from 12 to 27, median 18, in professional education; range from 25 to 104, median 40, in general education. The undergraduate teacher-education programs of colleges and universities accredited by the NCATE point to slightly higher requirements in semester hours: For elementary teachers, a range from 18 to 69, median 34, in professional education (*including* professionalized subject matter); for secondary teachers, a range from 10 to 51, median 23, in professional education; for elementary and secondary teachers, a range from 11 to 97, median 46, in general education. The NCTE committee on preparation and certification believes that the median requirements of the states and the institutions are reasonable guides for a four-year college preparation of the elementary or secondary school teacher of English insofar as professional education and general education are concerned.

For the high school teacher of English, state certification requirements in the area of English, journalism, speech, and library science combined as the language arts, measured in semester hours range from 0 to 40, median 24, for teaching English full time; range from 0 to 40, median 18, for teaching English part time. In the colleges and universities accredited by the NCATE, the semester-hour requirement in English for the teaching major ranges from 18 to 64, median 30. Sixty-eight percent of these institutions require 30 to 39 semester hours of English for the teaching major, 17 percent 20 to 24 hours, 6 percent 25 to 29 hours, and 9 percent 40 to 64 hours. The median requirement of the institutions for an English major exactly meets the minimum of the NCTE resolution adopted in 1957; the median state requirement for certification in English is too low.

Still lower is the minimum college preparation to teach high school English in the majority of the states. Assume that school administrators will observe a recommended standard in states having a blanket certificate—which is a shaky assumption. Even then the minimum requirement for English is less than 24 semester hours in 29 states out of the 50, less than 18 semester hours in 22 states, less than 15 semester hours in 10 states, and less than 10 semester hours in six states. Two states require only six semester hours; two states require none. If the certification requirements in the lowest states are taken as an indicator, it seems that the teacher of English in high school must be a healthy United States citizen, of a proper age, sworn to be loyal, schooled and experienced in educational theory and method, but he may be an ignoramus in English.

Enforcement

If all school administrators were qualified and responsible, and all school boards enlightened and public-spirited, the employment and assignment of teachers would be done properly without enforcement procedures. But under the present circumstances, it is necessary to

enforce certification with such measures as these: (a) making it illegal for a board of education to grant a contract to a teacher who does not hold a valid certificate for English if he is permitted to teach English; (b) making it illegal to pay a teacher who is teaching English without a certificate in English; (c) withholding state financial aid from a school which is guilty of (a) or (b); (d) depriving the administrator of his administrative certificate if he assigns anyone to teach English without a certificate in English; (e) withholding accreditation from a school which permits anyone to teach English without a certificate in English. Granted these are stern measures; but think of the boy or girl who is subjected to the poorly prepared teacher of English.

Standards for accreditation of the high school must support certificate requirements. In some states where the major preparation for a certificate to teach English is respectable, a poorly prepared teacher may be employed and assigned because low accreditation standards permit it. This is true of both state and regional accrediting. For example, the North Central Association of Colleges and Secondary Schools accepts the minimum standards of the states where its member schools are located, but not less than 15 semester hours of English, except that, in the case of unified courses which draw their subject matter from two or more teaching fields, the minimum preparation is 20 semester hours appropriately distributed among the teaching fields concerned. Ten of the NCA states which have a major teaching field in English of 24 to 30 semester hours permit accreditation of a high school where the English teacher has only 15 semester hours of English. In this way the standards of accreditation, state and regional, nullify the higher standards of certification.

The extent to which this nullification reaches—and the extent to which the teacher of English has only a minor preparation in English—is not known precisely, but there are some indications. In 1953-54 about one fifth of the Oklahoma high school English teachers had less than the standard-certificate minimum in English. In 1956 nearly one third of 710 English teachers questioned in Michigan had less than 24 semester hours of college English, and nearly one eighth had less than 15 semester hours of English, which was the state minimum requirement to teach the subject. In 1957 many of the 260 public high schools in South Dakota had no English teacher with more than 15 semester hours of English. In 1958 about one third of 440 English teachers in Wisconsin reported only a college minor in English, and 9 percent less than a minor. Conditions in these respects in some other states have been estimated to be worse than in Oklahoma, Michigan, South Dakota, and Wisconsin.[5]

The results of the committee's efforts are hard to evaluate. The chief products of its study and collection are (a) a file of 177 articles and reports on the preparation and certification of teachers, which are lent upon request; (b) an annotated bibliography on preparation and certification, published as a pamphlet covering 1950-1956, and in *College English* a supplement of items that belong to 1957; (c) the resolution adopted by the NCTE in 1957 defining minimum standards of college preparation to teach high school English; (d) a biennial survey of state certification requirements to teach English in high school; (e) a sur-

[5] From committee studies. See also "English Taught Here," *Time* 72:63, 8 September 1958.

vey of the use of examinations as a basis for teacher certification and membership in professional organizations; (f) a rough draft of a booklet on the preparation and certification of high school English teachers.

All the regional and some state accrediting agencies have been requested to accept as a minimum preparation for English teachers the standards of the NCTE resolution of 1957. The agencies have not responded. Seven of nine states where the committee has provided information, resolutions, letters or speakers have raised the certification requirement for college preparation in English for the high school English teacher. A majority of states have low standards for English teachers. Much needs to be done to improve this situation.

Studies by the Committee

1. John H. Fisher. "Certification of High School Teachers." *College English* 19:344-48, May 1958.

2. *Preparation and Certification of Teachers of English, a Bibliography, 1950-1956.* Donald R. Tuttle, chairman; Autrey Nell Wiley, editor. Champaign, Illinois: National Council of Teachers of English, 1957. 58 p.

3. "Preparation and Certification of Teachers of English: 1957 Supplement to *A Bibliography, 1950-1956,*" edited by Autrey Nell Wiley. *College English* 20:227-40, February 1959.

4. Donald R. Tuttle. "A Professional Teacher of English for Every American Student." *College English* 20:87-91, November 1958.

5. Donald R. Tuttle, "Improving Certification Requirements." *College English* 17: 353-55, March 1956.

6. Donald R. Tuttle and others. "Preparation and Certification of Teachers of English: A Symposium." *College English* 18: 295-309, March 1957.

7. Vern Wagner. "Theocracy in Education." *College English* 17:349-53, March 1956.

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James R. Powers
and Simone Oudot

Parlons Français

Team-teaching in a foreign language utilizes a mass medium: television.

EFFORTS to raise the quality of education by broadening and strengthening the curriculum and by making possible more nearly individual pupil progress are observable in many elementary and secondary schools. Such efforts, however, face constantly increasing numbers of pupils in our schools and increasing difficulty in finding competent teachers.

The teaching profession has not been unaware of the developing situation, as various experiments in staff utilization attest. Some of these, such as the Bay City, Michigan, plan of utilizing teacher aides, have sought to relieve the teacher of clerical and other nonprofessional duties in order to permit full-time attention to higher level activities. In the metropolitan Boston area, Lexington, Concord and Newton have been using part-time assistants to correct English compositions, thereby lightening the load of the English teacher where it weighed heaviest.

A promising plan at both elementary and secondary school levels is that of forming teacher teams in order to take advantage of the strengths of two or more individual teachers. The size of the group or class varies according to the arrangements worked out by the team. A demonstration or illustrated lecture by one teacher may benefit a class of 100; individual help or small group work may be directed by another teacher of the team.

Staff utilization studies are especially needed in the field of modern foreign languages. In this area a shortage of competent teachers is coinciding with a renewed interest in language study and with a general acceptance of objectives of listening and speaking proficiency, the achievement of which requires the investment of adequate student and teacher time.

Fortunately, we have some assets not available to earlier generations, assets which can help if well utilized. Electronic and mechanical language-learning

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equipment, when in competent hands, can be a blessing. But the competent hands and guiding spirit of the teacher must be there.

Varied Approaches

While the shortage of modern foreign language teachers exists at all levels, it is nowhere more serious than at the elementary school level. The discontinuance in the past few years of many promising FLES (Foreign Languages in the Elementary Schools) programs makes clear the need for adopting a variety of approaches and adapting newer media to the solution of personnel problems.

The fact is that team teaching has been tried in the foreign language field. The combination of a teacher, who was primarily a linguistic scientist and who would direct the teaching-learning process, and of a native informant who would serve as a model and as conductor of practice sessions, was tried in the Intensive Language program of the American Council of Learned Societies. This plan was followed to some degree by the various Armed Services, and by industrial concerns, such as oil companies, for the training of personnel for overseas assignments.

The institution of language laboratories has also brought about the cooperation of professor and laboratory assistant in the foreign language departments of many colleges in somewhat the same manner as in science departments. This type of teamwork has also been tried at the high school level. At Concord, Massachusetts, High School for the past two years French classes have spent half of each period with the regular teacher and the other half in the language laboratory with a laboratory assistant whose fluency in the foreign language enabled her to correct and assist individual pupils.

Again in the field of foreign languages, but this time at the elementary school level, several mass medium experiments in teaching through TV have been attempted throughout the nation. Most of these are related to the FLES movement which, apart from rather isolated but successful work in places such as Cleveland as early as 1921 and Los Angeles and Washington beginning in the forties, belongs to this decade.

Its growth in a period of five or six years was so rapid that in 1957 Parker [1] observed that the FLES movement threatened to snowball. In view of the acute shortage of qualified classroom teachers, it was natural that a mass medium be tried. One of the earliest TV programs in Spanish for elementary schools was given in Buffalo by Professor Manuel Guerra, under the name, "Fun To Learn about Latin America." Among other such programs we may cite the efforts of Mrs. Marian Minturn Walter, in Chapel Hill, North Carolina, who, since last year, has offered "Rendezvous en Français" three times a week over WUNC-TV. Another program is in Philadelphia, also in French, taught by Edith Kern since 1957. She gives daily 15-minute lessons to fourth and fifth graders.

The Modern Language Project is taking over from there. Observable on the one hand, were successful projects in team teaching, and on the other, the many attempts to teach a language through a mass medium. The project proposes to join the two together and thereby partially remedy an acute need for specialists in the foreign language

[1] William Riley Parker. *The National Interest and Foreign Languages.* U.S. National Commission for UNESCO, Department of State. 1957.

field. The teacher team in this case consists of an expert native teacher and a classroom teacher who has had considerable, little, or no previous study in the foreign language. The mass medium, TV, will be used by the expert teacher twice a week to teach elementary school pupils. The instruction may be carried on at other times by the local classroom teacher.

In order to improve the effectiveness of this combination, the expert teacher will use TV once a week to give a special program intended to prepare the classroom teacher for the week's work and "area coordinators" will provide consultant service. Thus the project will train teachers. At the same time it will teach hundreds of children who, without the program, would have to wait three or more years to learn a foreign language.

While the above mentioned experiments and projects went on in the nation, Massachusetts was not unaware of what was happening. Many public school systems experimented with foreign language in the elementary schools as far back as 1952 and 1953. Their programs were so successful that they have grown and expanded and serve now as models for beginning FLES programs. Among them, Lexington and Medford are certainly two outstanding school systems. In Lexington, pupils who begin the study of French in the third grade can have a continuous program of instruction. This year, ninth graders, some of whom started in the third grade are enjoying their seventh year of the study of French. Medford experimented extensively in the training of classroom teachers who at first taught French to all children in the third grade. Now, selected fifth and sixth grade pupils are taught by specialists. At the seventh and eighth grade levels FLES pupils are continuing to acquire proficiency.

A Regional Program

More recently, one of the significant educational activities of PTA's in the many Massachusetts communities during the past few years has been to study the possibilities of introducing a foreign language program in elementary schools. Parents in some of these communities have been so keenly aware of the advantages of beginning foreign language study early that, where feasible, they have organized after-school classes for their children supported by a small fee. This movement among our PTA's has helped a great deal in promoting the idea of elementary school language programs in Massachusetts and it has resulted in further spreading a general awareness of the benefits of such programs and in awakening interest in many more communities during the past two years.

When the Massachusetts Council for Public Schools began to be interested in FLES programs in the state, it realized the need for making information on the subject available. It published a booklet written by prominent members of its committee on FLES. It offered its services for advice, placement of teachers and talks to groups. It was not long before the FLES Committee realized that the scarcity of qualified teachers was the greatest difficulty met by any interested school system.

At the same time, a group of laymen and professional educators in Boston was organizing in-school programs on television which were given over WGBH, Channel 2. These series, including science, music, social sciences, etc., for either elementary or secondary levels, were already popular. One measure of

their appeal is the fact that from the original 40 school systems that planned to take part in this in-school program the number has now risen to over 120. The program is now known to all as the "21-Inch Classroom."

The group which was responsible for its creation then came in contact with the Massachusetts Council for Public Schools. Talks began on the possibility of adding a French course to the curriculum. It was suggested that a televised course in French would make available to interested schools the benefit of an excellent teacher, who would give the best possible example of French speech and pronunciation and thus help less well-trained teachers in their classroom work.

Through the members of its FLES Committee, the Massachusetts Council's attention was brought to a very successful program of French teaching through television which had already won national recognition. This program, "Fun with French," was given in the Schenectady public schools over WRGB by Mrs. Anne Slack. By 1958 it already had 110 FLES classes. It was planned to extend the program, which started in the third grade, to the sixth grade by the fall of 1959. The program boasts of being the oldest continuous foreign language program by television in the country, and has been the subject of articles in *Life, Parade, Parents' Magazine* and the *Christian Science Monitor,* as well as domestic and foreign educational journals. The problem then was to attract Mrs. Slack to Boston.

The FLES Committee worked out a proposal covering the children's programs, which was submitted to the Fund for the Advancement of Education, and a second proposal covering all phases of the teacher training program, which went under Title VII of the National Defense Education Act. "Parlons Français," more than a year after its conception, was finally endorsed and given financial support by both the Ford Foundation and Title VII of the National Defense Education Act, with additional support coming from school systems (through the Eastern Massachusetts Council for School Television) and from the Massachusetts Council for Public Schools. The total budget of the Modern Language Project, a division of the Massachusetts Council for Public Schools, the organization responsible for "Parlons Français," amounts to approximately $156,000.

TV Teaching

To carry out the work entailed in such a program, the Modern Language Project staff is composed of a director and his assistant, a TV Teacher and her associate, two full-time and two part-time coordinators, and two secretaries. The role of the area coordinators is seen as a very important one of public relations and advising on administrative as well as linguistic problems, which may be raised by individual school systems. They will be helped in their work both by a comprehensive Teachers' Guide and by monthly regional conferences which will give them further opportunities for direct contact with the teachers involved.

The programs will be given over WGBH-TV, Channel 2. Mrs. Anne Slack, a native French teacher of elementary school French, will give two 15-minute lessons for children each week, on Tuesday and Thursday mornings at 9:15, repeated at 10:45. The unique medium of television offers tremendous advantages in that the TV teacher can make use of elaborate audio and visual aids in her

presentations. Some scenes filmed in France are planned in order to bring French civilization into the classroom and teach children about a country where people do not live or dress exactly as we do.

During her six years of experience in the Schenectady public schools, Mrs. Slack experienced many touching examples of the closeness felt by her little viewers with their TV Teacher. Each child literally believes, she says, that she is addressing him in person. When they see her in the street or a store, or when she visits the school, the word passes around quickly and little boys and girls crowd around her and call her by her name, greeting her in French and asking for her autograph. Several years ago she was told of a little girl who happened to be sick one Monday morning and watched the French program at home. The little girl's parents were puzzled to find that she began to be taken ill regularly every Monday morning, but got well again by noon, until they discovered that their daughter had adopted this means of staying home and watching the program. As a result of their interest and enthusiasm, the program was ultimately established in her school.

Stressing quality rather than quantity, the lesson content for children will include no more than 200 words for the first half-year and possibly about 300 for the second half. Mrs. Slack will use as little English as possible for her presentation. Questions asked by her in French and answered by the whole class, activities shared with children who sometimes appear with her on the screen, songs rehearsed and sung with the TV Teacher establish a close relationship between the TV Teacher and her some 60,000 pupils in over 2,000 classrooms, from 5 different states. In preparing her script for television, Mrs. Slack will follow closely the lesson content of the Teachers' Guide.

To help classroom teachers in their task and give them appropriate directions for using the Teachers' Guide with maximum results, Mrs. Slack will conduct half-hour in-service TV programs for teachers on Monday afternoons at 3:30. These will familiarize the teachers with the materials used during the week for the children's lessons, and serve as a refresher course for those who need it. Use of additional materials for the week's work will also be explained. The lesson content, and suggestions about how to make the most effective use of it in the individual classroom will also be found in the Teachers' Guide.

The in-service program will be complemented by the work of the area coordinators previously mentioned, whose main task will be as described, that of itinerant consultants and also that of reporters to the project. Mrs. Slack will rely heavily on their reports on classroom reactions on the part of children as well as of teachers to guide herself in the writing of future scripts and in the revising of the entire program by the end of the year, when it is planned to put it on film. The area coordinators will therefore be in close contact with school administrators and teachers and will be ready to help wherever asked. These area coordinators have been carefully chosen for their proficiency in French, their knowledge of the American school system and their aptitude for public relations work. Finally, regional conferences will bring together teachers of each of the four areas and give opportunities for exchange of views, discussion of problems, and suggestions.

The above features will enter into each

(Continued on page 188)

Arnold B. Grobman

Life Sciences in American Schools

Aim of life science courses is to present modern knowledge about biological sciences.

A GENERATION ago it was nice to have a course in biology in high school. It was part of a general background and helped one appreciate the world in which we live. Biology was a cultural subject.

Today biology is an essential subject. Today's high school students are tomorrow's citizens and they will have to participate in the great debates and policy determinations in the areas of radiation and fallout, fluoridation, public health, group medicine, mental disease, agricultural surpluses, foreign aid, space travel, overpopulation, and many other biologically oriented social problems.

Some of these problems were unknown a generation ago and all have increased in urgency and importance. The biological literacy of our citizenry will not only affect our survival but is essential to the integrity of our society.

With regard to the biological sciences, the two major questions facing our schools are whether we are offering (a) the right kind of biology and (b) enough biology. Answers to the first question, in conjunction with similar evaluations for other significant areas of the precollege curriculum, will largely determine the answers to the second question.

The Biological Sciences Curriculum Study is now involved in a careful investigation of this important first question.

Arnold B. Grobman *is director of the Biological Sciences Curriculum Study, American Institute of Biological Sciences, University of Colorado, Boulder.*

Origins of the BSCS

For many years, unlike their colleagues in the fields of physics and chemistry, the biologists have not had a single strong central organization. Their professional activities were generally pursued through a great variety of small scientific societies centered around restricted disciplines, such as genetics, botany, herpetology, mycology, fisheries, plant pathology, and anatomy.

In 1948 a number of these independent societies, while still maintaining their separate identities, joined together to form the American Institute of Biological Sciences. The AIBS soon developed a

number of programs that went beyond the activities the individual societies could attempt either separately or collectively. Early in its history and well before the era of satellites, the AIBS evinced great interest in biological education. One of its first successful ventures was the Visiting Biologists Program in which distinguished biologists visited small liberal arts colleges, where such a scientist was not in residence, and provided great intellectual stimulation for students and faculty. During the present academic year these biologists are visiting a number of secondary schools as well.

Another educational activity of the AIBS was the development of the secondary school film series being sponsored by the Ford Foundation. Under this program a tenth grade biology course is being put on film and will be available for nation-wide use in September 1960.

The most recent AIBS effort, and one with great potentiality for the improvement of biological education in America, is the Biological Sciences Curriculum Study. The BSCS began its operations in February 1959, with initial grants from the National Science Foundation totaling almost $750,000. The Study is national in scope and has established headquarters on the campus of the University of Colorado in Boulder.[1]

BSCS Organization

General policy of the Study is determined by a Steering Committee which consists of one or more persons representing the following categories: professors of biology, high school biology teachers, science coordinators, science educators, state department personnel, medical and agricultural educators, and university administrators.

The largest single group on the Steering Committee consists of the professional biologists, for we believe that the design of a new curriculum in biology should depend heavily upon a solid knowledge of modern biology. Men working on the frontiers of the science have such knowledge. Chairman of the Steering Committee is Bentley Glass of the Department of Biology of Johns Hopkins University. The Study itself was organized by the AIBS Education Committee under the chairmanship of Oswald Tippo of the Department of Botany of Yale University.

The central office staff of the BSCS is small, since most of the work is being done by consultants and committees. The present major committees are: Content of the Curriculum, Innovations in Laboratory Instruction, Teacher Preparation, Gifted Students, and Publications.

Design of the Study

In a number of ways the design of the Study is different from that in physics at M.I.T. and the mathematics study centered at Yale University. The Physical Sciences Study Committee has produced an excellent single course for the secondary schools. The School Mathematics Study Group is developing a curriculum for grades seven through twelve. The biologists are interested in making recommendations about education in the life sciences over a broader area—from kindergarten through graduate and professional schools. They are also concerned with effective use of mass communications media for the biological education

[1] The BSCS is publishing a periodic Newsletter. It may be obtained by writing to: The Director, Biological Sciences Curriculum Study, University of Colorado, Boulder.

of that great bulk of our population who will no longer be classroom students. Primary attention is being initially focused at the high school level, since this is considered to be the pivotal area in American education today.

The first question the committees are attempting to answer is a disarmingly simple one, "What knowledge about the life sciences should the average student have upon graduation from high school?" After the general parameters of this body of knowledge are defined, the working committees will begin to establish the factual and conceptual blocks of biology that should be introduced into the curriculum K through 12.

A dual approach is being used: by a committee concerned primarily with over-all content and by a committee interested specifically in laboratory presentation. It is planned that a writing conference will be held during the summer of 1960 to produce a sample textbook and laboratory manual which will subsequently be tested in about 20 centers throughout the United States involving, perhaps, 100 secondary school biology teachers and their students. The feedback from these teachers and students will be used to revise the sample text and manual during the summer of 1961. It is anticipated that preliminary editions can then be released for the academic year 1961-62. It is hoped that these will serve as models for independent textbook writers so that a great deal of flexibility will continue to be a feature of our educational system.

While this work is under way, careful studies will be made of the requirements for special categories of students, such as gifted students and college preparatory students. What will be done for them is not yet clear, for our present attention is focused on the initial course that is being designed for the average student.

Help for Teachers

In order that such a new biology course (or courses) may be successfully taught, it is essential that teachers have opportunities to become substantially informed about the many modern developments in the life sciences. One way would be to make the new biology course, with appropriate background material, available at summer institutes. As a second method, we plan to provide very extensive commentaries for teachers along with the sample textbooks.

Still another approach that is being considered is the production of a series of monographs or review pamphlets, each of which would be written by an appropriate outstanding scholar and would be devoted to a single topic in the field of the life sciences. These pamphlets would be designed primarily for secondary school teachers; would be well illustrated and well documented. It is intended that they would be issued periodically and would be revised as new developments emerge in particular fields of study. In this way, a high school biology teacher could readily build up an effective library giving him depth in the subject matter he is teaching.

After these programs have been initiated, the BSCS will devote its attention to elementary and college levels.

At each instructional level the work of the BSCS will pass through two general phases. The first will require the greater contribution from professional biologists, for this phase will be the identification of the content of the curriculum which depends on an extensive knowledge of modern biology. The second phase will require the larger con-

tribution by secondary teachers (or elementary or college teachers according to the level) and educators, for they are far more experienced with presentation to their students.

A New Contribution

Why is such extensive support being given to such a serious effort in biological curriculum development when for many years there has been wide concern with the high school curriculum? A tremendous amount of work has already gone into the design of biological curricula at the high school level. Much of it is good, sound and solid. What is the justification, then, for this new effort? Is there a single important way in which the BSCS differs in its approach from these many independent studies that have been made over the years by high school faculty members, education faculty members, and state and urban education department staffs?

The unique contribution is that the BSCS involves the active and cooperative participation of a large number of outstanding professional biologists who know the life sciences intimately through their firsthand investigations. These biologists bring to the new biology curriculum an exhaustive store of modern knowledge, overview and perspective that is available nowhere else in our society.

The potentialities for a great contribution become apparent because the curriculum will be devised by these scientists jointly with expert teachers, administrators and educators. I doubt if such an intensive cooperative effort could have developed in the intellectual climate that existed in America a short five years ago. The clear prospect is for a tremendous improvement in biological education in the United States. It now seems certain that this will be accomplished as part of a significant revolution in American education and not through substitution of curricula derived from totalitarian countries.

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M. L. Keedy

Mathematics In Junior High School

At what maturity levels and with what materials can certain mathematical concepts be taught?

THE University of Maryland Mathematics Project (Junior High School), made possible by a grant from the Carnegie Corporation of New York, is in the third of its three years. The grant is administered by the College of Education, and policy is guided by an advisory committee, whose members represent the Department of Mathematics, the College of Engineering, and the Department of Psychology, as well as the College of Education. Members from outside the university represent the U.S. Office of Education, the Maryland State Department of Education, and the Maryland State Teachers Association, besides the four major public school systems near the university—Washington, D.C., Prince Georges and Montgomery Counties, Maryland, and Arlington County, Virginia.

M. L. Keedy *is associate director of The University of Maryland Mathematics Project (Junior High School), College Park, Maryland.*

The primary goal of the project has been to determine maturity levels at which certain mathematical concepts can be appropriately taught, and to prepare course materials for a teaching sequence in grades seven and eight that is mathematically and psychologically sound, and appropriate to modern-day needs. Results of the study are to be made available to various persons and organizations with interest in curriculum research and planning.

Staff and Organization

Director of the project is John R. Mayor. The author joined the project at its inception, as associate director, and a second associate, Helen L. Garstens, joined the staff a year later.

From its beginning, UMMaP has involved classroom teachers, as well as mathematicians and experts in other fields. About 25 persons, recommended as competent teachers by their administrations, participated in a weekly seminar

on the University of Maryland campus. In this seminar they heard lectures on mathematics and psychology, and developed materials for preliminary trial in their own classes. On the basis of such experience, the writing teams prepared the experimental courses now being taught in grades seven and eight. The seminar has continued, and still holds a place of central importance to the project.

In addition to the director and associate directors, the staff now consists of three graduate assistants, a psychologist (part-time), who directs the evaluation of the experimental courses, and two secretaries. All but the secretaries have additional duties, such as the teaching of regular classes.

In the summer of 1958 the staff wrote the first part of the experimental seventh grade course, in addition to conducting a special four-week National Science Foundation Institute. The experimental course was taught in some 43 classes in the year 1958-59. It was at this time that a psychologist joined the staff to direct the evaluation. Experimental classes and control classes were selected, and extensive testing was done in all of these. Control classes were of two kinds: traditional classes taught by teachers also teaching experimental classes, and traditional classes taught by persons not familiar with the new course. At this writing, the data have been only partially processed, but an evaluation report is to be released in the near future.

In the summer of 1959 the seventh grade course was revised and the first part of an eighth grade course written. During 1959-60 the revised course is being taught in grade seven, and the new eighth grade course is being taught and will be evaluated. In this evaluation there are more kinds of control classes than the previous year, since the eighth grade course embraces much of traditional first-year algebra, as well as arithmetic. Therefore some control classes are algebra classes, and some are arithmetic classes. As in the previous year, some control classes are to be taught by experimental teachers and some by persons not familiar with the experimental materials.

Principles Followed

The content of both courses was chosen in such a way that several basic principles are followed. It was felt, for one thing, that the separation of algebra and arithmetic, which is usually made, is artificial and detrimental to learning. Therefore no distinction is ever made between the two subjects in the UMMaP courses. The word *algebra* never appears, even though the equivalent of first-year algebra, as traditionally taught, is embodied in the two years' work. Rather, *properties of numbers* are studied, and those properties used to carry out calculations, solutions of equations, factoring and the like.

It is also known to be important to seek unifying concepts, in order that the total number of basic ideas may be reduced. Unifying concepts of several kinds have been used in the courses. Among the most important of these is the concept of a *mathematical system,* which is introduced early and used again and again.

A third fundamental principle concerns the use of language. It soon becomes apparent to those concerned with the precise expression and communication of ideas that the language traditionally used in mathematics is heavily lacking in precision. Present vocabulary and habits of usage have been accumulated over thousands of years of mathematical activity, and one easily finds vague and

contradictory notions, as well as a lack of words with which to express today's mathematical ideas clearly and briefly. Therefore the writers have spent considerable effort in clarifying ideas by altering language and using it precisely.

A fourth fundamental principle is that the student should *understand* mathematics, rather than simply learn by rote a variety of manipulative skills. Furthermore, motivation and retention should be far greater when students can be led to make discoveries themselves. For these reasons the course materials, including texts and teacher manuals, have been written so as strongly to encourage discovery on the part of students. The discovery is to be both inductive and deductive, in accordance with good mathematical method. The deductive reasoning on the part of students is first very informal, becoming gradually more and more formal.

Progress to Date

No formal report on the experimental teaching can be made now, in the absence of statistical compilations. It is possible, however, to mention several items which indicate the progress of the project to date. For example, it has been demonstrated that junior high school children are far more capable than had been supposed. This may not be a surprise to many, but it is of foremost importance to demonstrate it conclusively.

Seventh graders, low average, average and above average, consistently grasped rather sophisticated mathematical ideas easily and with less difficulty than their own teachers. Excellent teachers reported again and again their surprise at how easily their students learned new concepts that had been difficult for the teachers themselves. Many experienced teachers, after teaching the experimental course, confessed that they had not believed it possible to teach such material to junior high school students. Apparently seventh grade children are mentally more mature than has been imagined, even by persons with good imagination, and their intense curiosity enables them to digest and enjoy mathematical concepts of some intricacy. Enthusiasm has been high.

Teachers have shown an increasing spirit and interest in the work. Administrators and parents have welcomed the new program, and the interest and enthusiasm of children have consistently been reported to be at a new high. The high spirit and enthusiasm of the teachers cooperating in the project have impressed the staff with the fact that it has probably conducted, incidentally, a new type of inservice program, so successful that it can be heartily recommended. The project has brought together classroom teachers, supervisors, mathematicians, psychologists and educators in a joint effort. The importance of this would be difficult to exaggerate. Relations between these various persons have been good, and the project could probably not have operated as it did otherwise.

Interest in the project and its experimental courses across the country and in foreign countries has grown rapidly. Cooperation has been given wherever possible to school systems, institutions of higher learning, and to other projects, including the School Mathematics Study Group. Samples of course materials have been made available at near cost to persons interested. These have included not only teachers and supervisors, but parents, professional mathematicians, and publishers. It can be expected that the writers of commercial textbooks will be influenced by these materials.

Research Implications

The implications of the work done so far are difficult to assess completely. It is possible, nevertheless, to draw some conclusions, based on the work of this, together with other projects. It is well agreed by persons concerned with the project that curriculum revision, other than that of a minor sort, cannot be done well by a single school system, even a large one, using present procedures. Rather, it is a task which needs the attention of research teams in the universities. Curriculum revision ought properly to be considered as an area of university research, with the cooperation of public and private schools. There must be freedom on the part of experimenters to try many kinds of innovations, without burden of the problems that ordinarily beset the classroom teacher in a school system. Moreover the experimenter must be relieved of any fear that his experiment may produce negative results.

In this way, research projects can determine what materials may be taught, and by what procedures, to students of various ability and maturity levels. Courses can then be written for possible adoption by school systems. It is important that a research team include specialists of several kinds. It is particularly important that the team include subject area specialists, and provision for liaison with subject area specialists, as well as specialists in psychology. Currently education is enjoying, in the areas of mathematics and science, cooperation between subject matter specialists and educators. Such cooperation has unfortunately been lacking in the past, and it is to be hoped that it will never again be lost, but can be increased, and spread to other areas, as time goes on.

It is obvious from the experience of several mathematics curriculum projects that no single best curriculum exists. Several experimental courses, with some similarities, but also with wide differences, have been written and tried, all with apparent success. The desire, seemingly universal, to standardize course content across the country, or within a school system, could well result in the eventual formulation of standard courses, but for continuing progress in curriculum development it would seem that such standardization should be avoided. Then the curriculum can remain open for gradual change, rather than becoming ossified and awaiting an eventual painful rejuvenation, such as is being experienced now.

Although the efforts of UMMaP are aimed primarily at grades seven and eight, implications for curriculum changes at levels below and above these became apparent early. Such is, perhaps, what should be expected. The view held by some, however, that curriculum research and building should begin in the early grades and work upward, is not tenable. Good research at any level will undoubtedly have implications for all levels. Here is a further point to emphasize that continuing experimentation and change should be embodied as a fundamental in the approach to curriculum development.

Since mathematics in the junior high school can, and apparently should be, far different than it has been for the past several decades, the need for new training programs for prospective teachers is clearly immense. Moreover there is a tremendous need for additional training for teachers in the field, and for revised certification requirements. The new training must necessarily include more and different mathematics content than have past and present curricula. Further-

more, the mathematics content must include contemporary approaches to mathematical concepts, whereas the traditional college mathematics courses do not.

It is not too early for teacher training institutions to consider a rapid change in their requirements and course offerings. Many have already begun. Nor is it too early for school systems to institute in-service training programs aimed at providing present teachers with an introduction to modern mathematical ideas, and at encouraging them to continue their study individually.

One universal result of research is the bringing of its shortcomings into focus, and showing the need for further work. The University of Maryland Mathematics Project is not exceptional in this regard. Several attacks on psychological problems have been made, with less success than had been hoped. Tape-recorded interviews of children were conducted, as well as special interviews of children by a trained interviewer, in attempts to discern readiness for concept formation, and to ascertain attitudinal development. Pressures of time have prevented the developing of these techniques, and the data have been useful to a more limited extent than would have been liked. A mathematics attitude inventory has been constructed, however, and is in process of being standardized and evaluated.

It is now realized that the problem of junior high school mathematics curriculum is so vast that the three years provided by the Carnegie Corporation grant is sufficient to provide only a good start. The staff agreed in the beginning to concentrate on grades seven and eight, for reasons of time limitation, and because the curriculum for these two grades is known to be the weakest link in the chain. In retrospect this appears to have been necessary, but not particularly wise. Curriculum workers, it appears, still are thinking in terms of the 8-4 plan, in spite of the fact that most school systems have gone, or plan to go, to the 6-3-3 plan. It appears to this writer extremely important to develop a *junior high school* curriculum, rather than an elementary and a secondary curriculum.

Research in mathematics curricula has now made it possible for rapid and drastic changes to be made, largely as a result of the financial support of the several foundations. Nevertheless, it is important for schools to plan for flexibility in curricula for a long time to come, and for universities to accept the financial responsibility for continuing the work which has been made possible by the assistance of the foundations.

LEADERSHIP. . . .

a quality to be identified and utilized for democratic action toward the improvement of our schools.

COMING SOON

Leadership for Improving Instruction

1960 ASCD Yearbook

Max Beberman

Improving High School Mathematics Teaching

Students must be skillful computers in order to work effectively with ideas.

LET us drop in on a ninth grade algebra class in the traditional mathematics curriculum. The teacher introduces the lesson by telling the class:

Today we shall learn how to add terms, and we shall also learn how to tell when they cannot be added. Who remembers what a term is?

A student replies:

A term is an indicated product of numbers and letters.

The teacher nods his head in agreement:

Yes, we shall learn how to do problems like $2a + 3a$, $4b + 7b$, $8x + 3y$, etc. How do we add $2a + 3a$?

Then, since the question is rhetorical and since the student needs to "understand" the problem, he continues:

Suppose Mary has two apples and Bill has three apples. How many apples do they have altogether? . . . Yes, they have five apples altogether. So, $2a + 3a = 5a$. Just add the numbers and write the letter next to the answer. Who knows what $4x + 7x$ is ? . . . Good, yes, $4x + 7x = 11x$. Now, turn to your textbook, and do the first 10 exercises on page 34.

These exercises are just like the ones discussed by the teacher, and the class finishes them very rapidly. Next, the teacher poses the question:

What is $2a + 3b$? Suppose John has two apples and Susan has three bananas? Can you add apples and bananas? (Rhetorical question.) Of course not. Therefore, you cannot add $2a + 3b$. You can only indicate their sum. Thus, we see that when the terms are like, you can add them. When terms are not like, you can't add them. Now do exercises 11 through 20 on page 34.

There are at least two things wrong with the kind of teaching illustrated above. For one thing, the "explanations" offered by the teacher have not the remotest connection with mathematics. Secondly, the students are passive, and are encouraged to acquire a skill through imitation alone. The University of Illinois' project for the improvement of the teaching of secondary school mathematics seeks to bring mathematics into the teaching of mathematics, and to encourage the learner to discover as much of the subject as time and circumstances will permit.

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Using Abstractions

The subject matter of mathematics consists of abstractions. Most everyone agrees with this statement. Among those who do is the teacher mentioned in the foregoing illustration. He also believes that learning proceeds most efficiently if you go from the concrete to the abstract. So, he "helps" his students by going from apples and bananas to 'a' and 'b', because he thinks that 'a' and 'b' are mathematical abstractions. (He also believes that equations are abstractions, and so in a lesson on equations he teaches students to solve equations by talking about scales or balances.) This distorted view of what mathematical abstractions are is a major block to effective teaching.

A mathematical abstraction is not a symbol or a mark which someone makes on paper or on a chalkboard. A mathematical abstraction is an entity which has no physical existence. A person becomes aware of a given abstraction after dealing with several instances of it. For example, justice is an abstraction, and as a child observes instances of justice and instances of injustice, he gradually reaches the point where he can classify a certain act as being an instance of justice or an instance of injustice; that is, as being a just act or an unjust act. Ideally, the child also learns the word 'justice' sometime after he has learned to recognize instances of the abstraction justice. He views the word 'justice' as a convenient label to use in talking about justice; he does not say that the word itself is the abstraction.

The same point of view holds for mathematical abstractions. A child becomes aware of the abstraction 3 by playing with objects. He notes instances of 3, such as a set of 3 blocks, a set consisting of a sandwich, a cookie, and an apple, and a set of 3 cars. After considerable experience, he becomes aware of a common property of these sets (or, of the collection of all such sets). At this point, he can tell you whether a given set is an instance of 3. The teacher can use such behavioral evidence to tell when the child has become aware of the abstraction. This is the time to introduce the child to the symbol '3' (or 'three' or 'trois' or 'drei'). The symbol '3' is not the abstraction. The abstraction is what the symbol stands for, to wit, the number 3. The number 3 is not the set of 3 apples nor the set of 3 food items, nor the set of 3 cars. Each of these sets is a "concrete" instance of the abstraction. All of this becomes perfectly evident when we observe normal children acquiring skill in the use of common nouns. A common noun, of course, is a symbol which stands for an abstraction. When a child no longer uses the word 'doggie' when he sees a cat, his parents feel that he is becoming aware of the abstraction dog.

Even though the proper subject matter of mathematics consists of abstractions, the teaching of mathematics is largely characterized by attempts to teach children efficient methods for manipulating symbols without giving children sufficient experience to become aware of the abstractions denoted by the symbols. Unfortunately, we pedagogues are ingenious enough to invent all kinds of mnemonic devices which enable students to remember mechanical procedures for manipulating symbols. We use mnemonic devices in the form of words like 'borrow', 'carry', and 'cancel', and in the form of rules and admonitions like 'invert and multiply', 'you can add like fractions but not unlike fractions', and 'like terms can be combined but unlike ones cannot'. Some students can be

brought to a high level of mastery of skills through devices of this kind. They perform well on tests which require them to demonstrate the skills in familiar settings. The result is different when we hide the familiar skill in a new situation, or when we test students after a summer vacation. In the former case, the student must be able to classify the new situation in terms of abstractions before he can manipulate.[1] In the latter case, unless the student has a really good memory (or unless he is one of the rare ones who is able to see connections between the abstractions and the mechanical procedures), he tells you that he isn't sure whether he should get a common denominator in order to multiply, or that he can't remember which fraction to invert, or that he's not sure whether $2a + 3b$ is $5ab$ or $6(a + b)$.

Now, it may very well be the case that the learning of mathematics *should* consist of lots of memorizing, with the prizes going to those who have the best memories and to those who have talent enough to enable them to put the abstractions into some sort of consistent structure and, when memory fails, to derive the mechanical procedures from this structure. Perhaps the current shortage of people who feel comfortable with mathematics can be best eliminated just by putting more emphasis on the memory work. If so, then most of the current mathematics curriculum reform groups are moving in the wrong direction. In particular, if the only way to get results is to give lots of practice in using mnemonic devices and not waste time on abstractions (that is, not waste time on mathematics), the program of the University of Illinois project for the improvement of mathematics teaching is destined to fail, and the interesting results already observed must be illusory.

[1] Dean Brownell tells the story of the second grader who floundered when his teacher gave him the problem: If 5 birds are sitting on a telephone pole and 3 fly away, how many are left? After listening to wild guesses such as 12, 6, and 5, the teacher said in desperation, "Look, 5 take away 3 is how much?" "Oh," said the student, "5 take away 3 is 2. Why didn't you ask me that in the beginning?"

Improving Materials

The University of Illinois Committee on School Mathematics (UICSM) was appointed in December 1951 by the deans of Education and Engineering and by the head of the Mathematics Department. The four-member committee was asked to investigate procedures for implementing the recommendations made by an earlier committee [2] for improving the competence of beginning engineering students to the point where they would be able to study calculus in the freshman year. It was quickly decided that a realistic proposal for improvement would have to include classroom-tested instructional materials.

In September 1953 a ninth grade course was tested in two public high schools in Illinois (Barrington and Blue Island) and in the University of Illinois High School. In the ensuing years we produced instructional materials for higher grades, we continually revised our earlier efforts, we increased the number of schools experimenting with the program, and we found it necessary to train the teachers who wanted to work with us.

In the current school year (1959-60) over 80 schools throughout the country are trying the UICSM program, our staff numbers 17, and the *eighth* version of

[2] University of Illinois College of Engineering. *Mathematical Needs of Prospective Students.* First edition, 1951; revised edition, 1959. Urbana: Office of Field Services, College of Education, 1959. 28 p.

the instructional materials for the beginning course has been published and released to the profession.[3] This expansion has been made possible financially by two 3-year grants from the Carnegie Corporation of New York amounting to a total of over a half-million dollars. The University of Illinois carried the complete financial burden of the project from its inception in 1951 to the time of the first grant in July 1956. The project was a "going concern" by the time its merit was recognized by the foundation, and the fact that the University had invested considerable money and staff time (and is still doing so) probably played an important part in attracting the support of an outside agency.

Foundation support has enabled us to use the full-time efforts of research mathematicians and high school teachers in developing instructional materials which are in harmony with our point of view regarding mathematics and its teaching. Most textbooks designed for the traditional curriculum place too much emphasis on recipes for manipulating symbols and give too little attention to the substance of mathematics itself. Although many textbooks do attempt to take care of "the why as well as the how," these attempts are very much like those of our teacher at the beginning of the article. They are primarily concerned with mnemonics.

As mentioned earlier, we believe that a student needs to become aware of mathematical abstractions before he begins manipulating the symbols which denote them. When he reaches the symbol-manipulating stage, he first manipulates according to what he considers "common sense." Quite frequently, common sense does not dictate the most efficient procedure, so the student then begins the search for short cuts, for algorithms, for mnemonic devices. Many students succeed in inventing such procedures and take considerable pride not only in the fact that their rules work, but also that they can prove that the rules must work. For in putting the major emphasis on abstractions rather than on symbols, the teacher enables the student to discover certain basic relations among the abstractions. The student notes, for example, that a first number multiplied by a second yields the same result as the second multiplied by the first. This property of numbers and multiplication is known as the commutative principle of multiplication.

Again, the student becomes aware of a principle to the effect that if you multiply each of a first number and a second by a third and add the products, you get the same result by adding the second to the first and multiplying the sum by the third. He gains this awareness by looking for easy ways to solve problems like:

$$7 \times 8 + 3 \times 8 = ?$$
$$7 \times 92 + 3 \times 92 = ?$$
$$63 \times 49 + 37 \times 49 = ?$$

By the time he reaches the problem of simplifying an expression like '2a + 3a', he jumps immediately to '5a', and tells you, if you ask, that '2a + 3a = 5a' is a consequence of the principle mentioned above and the fact that 2 + 3 is 5. If you ask him *how* he gets '5a', he will tell you his short cut. But, there is no need to ask the how-question. Any fool can plainly see *how* he does it! The important question is the one which asks for an explanation of *why* the short cut works. And the only mathematical answer is the

[3] UICSM. *High School Mathematics.* Units 1, 2, 3, & 4. Teachers' edition. Urbana: University of Illinois Press, 1959. 1432 p. (Looseleaf, photo-offset.)

one which refers to properties of mathematical abstractions.

The UICSM instructional materials are full of exploratory exercises designed to build awareness of abstractions. When we hope that a student will invent a short cut as a result of his work on, say, page 18, we do not give the game away by stating the short cut on page 19, or page 20, or anywhere in the textbook, for that matter. Also, we don't "beat the drums" for mathematics by telling the student that the subject will be important to him when he grows up. If we cannot make it important to him while he is studying it, we cannot justify making him study it. But, it is not difficult to make mathematics important to young people. When a child invents a rule which saves him labor and which he can prove is correct, no one needs to convince him that the rule is important. He has firsthand experience to support the thesis that mathematics is a living subject, and not just something embalmed in textbooks.

Disseminating Ideas

Foundation support has also made it possible for us to disseminate these ideas to teachers. We have developed special editions for teachers which accompany the instructional materials for students. These teachers' editions are really compendia of pedagogy and mathematics. In them we can defend the teaching approach used in the students' materials, and we can emphasize again and again the distinctions between mathematical abstractions and the corresponding symbols and the need for exploratory work to precede the symbolization. We can show the teacher how the mathematical structure of which the student is gradually becoming aware is really part of a much larger structure. We can show how a foundation is being laid for more advanced ideas. Finally, we can give very specific assistance in the form of accounts of successful alternative procedures used by other teachers in the preceding years of experimentation.

Another type of dissemination which the foundation supports is our Teacher Associateship program. Each year we invite five or six teachers to take a year's leave of absence from their present positions and spend it on our staff. (We contribute a fixed amount to the salary, and the sponsoring school system or college pays the rest.) Teacher Associates are given very light teaching assignments and spend most of their time in studying the content of our curriculum and in helping us work with teachers in cooperating schools. When a Teacher Associate returns to his own institution, he may want to revise the methods courses he usually teaches. If he is a teacher or a supervisor in a secondary school system, he may want to conduct in-service courses.

It should be clear that the UICSM does not sponsor a crash program. (In fact, we have been accused of being hairsplitters and perfectionists.) Nor do we advocate the wholesale substitution of so-called modern mathematics for the content of the traditional program. To be sure, the traditional program has developed certain excesses, particularly in the areas of complicated computation and manipulation, and we are in accord with other groups who advocate deemphasizing these topics. Also, we have brought into the curriculum a few ideas which mathematicians first became aware of in the latter half of the nineteenth century, and in the early years of the present century. The ideas are commonly included

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Creation of a mature course in high school physics is this committee's goal.

Elbert P. Little

PSSC: A Physics Program

LAST summer more than 600 high school teachers from all parts of the country spent part of their summer vacations in college, learning about a new program for high school physics. More than half of these teachers began teaching the new course in September. Those who could not make arrangements for using the new program this year were strong in their statements that they would not teach their conventional physics courses in the same old way any more. Only a very few did not like the new program.

Such is the reaction of practicing high school teachers to the PSSC program. They agree that the subject matter of physics courses has become cluttered with the technological details of our industrial civilization. They find that the modern concepts of physics are interesting and understandable. They know that their students will find a pleasure in the challenge to study carefully, think clearly, and participate vigorously in a mature course in physics.

The Physical Science Study Committee is a young organization, stemming from informal meetings of college physicists in Cambridge, in early 1956. First thoughts were to make first class teaching films and new kinds of laboratory apparatus to aid high school teachers in presenting the fundamental topics in physics. Examination of high school textbooks of physics revealed the terrible abyss between the material being presented as physics and the professional physicist's concept of his subject.

Greater changes in knowledge and understanding have taken place in the last 50 years than in the preceding 500, yet the textbooks contained almost none of the modern concepts. Laboratory work, confined to confirmations of existing knowledge, presented no challenge to the student because he knew the answer before he entered the laboratory. Resource materials to which the able student could turn to satisfy his desire to go beyond the confines of the course material were almost nonexistent. In a country proud of its educational system, the high school physics course was found woefully inadequate.

A New Physics Course

The original group of physicists found that others all over the country were interested in the situation. A grant from the National Science Foundation pro-

vided a means of organizing a working group. College, university, and industrial physicists; high school physics teachers, school and college educators joined in laying the foundation for a new course in high school physics.

From the beginning it was apparent that the problems were tremendous. A completely new set of learning aids was needed, including text, laboratory instructions, apparatus, films, examinations, teachers guides, and resource material for extra reading. At the same time it was painfully obvious that a careful selection of topics was required. All of our knowledge in physics could not be crowded into a one year high school course. A carefully considered syllabus was developed, with topics chosen because they were basic to pupils' understanding of both classical and modern physics.

Many honorable but timeworn topics were excluded. Simple machines, hydrostatics, elementary heat were suggested as suitable for eighth to tenth grade general science courses. Sound was dropped as an explicit topic because an expanded use of wave concepts was proposed for the section on light. The details of four cycle engines, radio circuits, the weather, and other interesting but not pertinent material were dropped for lack of time and textbook space.

The final syllabus was divided into four parts:

1. *The Universe,* for an understanding of measurements in time, space and matter; speed, acceleration, and the use of vectors; the fundamental experiments revealing the nature of matter, both chemical and physical.

2. *Optics and Waves,* beginning with geometric optics, developing a corpuscle theory of light to explain geometric optics, finding that it will not work, and finally developing a wave model, leading to an understanding of diffraction and interference.

3. *Mechanics,* starting with Newton's Law of Motion and encompassing motion at the earth's surface as well as in space, through careful development of concepts of momentum, energy, and the great conservation laws.

4. *Electricity and Modern Physics,* including the fundamental experimental evidence in electricity that has opened the way to developments in modern concepts of atomics, light, and energy.

Experimental Use

During the summer of 1957 enough progress was made on a text and on apparatus to convince the high school teachers working with the committee that they could teach the course. Five schools, in 1957-58, constituted the first test group, and from their experience much valuable information was gleaned. Reactions of students were unexpectedly favorable in spite of the troubles always present in a new course. Both students and teachers worked harder than usual but they received correspondingly greater returns.

In the summer of 1958 more than 350 teachers from high schools all over the country had a chance to become familiar with the course, now revised and expanded as a result of the first experimental year of use. About 270 of these teachers elected to use the course for its second experimental year. Close contact was maintained with these teachers,

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through visits, area meetings, and questionnaires. In this way the 270 schools and 12,500 students constituted a test and evaluation group of major significance, matching in scope and critical judgment the radical changes in content and teaching philosophy embodied in the new course.

Reports were not unanimously favorable. Some teachers felt that the course was suitable only for the academically talented students. *The Universe* proved to be a stumbling block—the scope of interest awakened in the students produced so many questions and new projects in class that it was hard to move on. The examinations, produced by PSSC staff people working with Educational Testing Service, were unexpectedly difficult. Grades were all relative but Johnny (and his parents) found it hard to understand that 25 correct answers to 40 questions could indicate a high achievement. The new kinds of laboratory experience either were damned as completely unworkable or were hailed as providing first class research experience for young minds.

Evaluation

The vast majority of reports gave vivid pictures of teachers, and their students, working harder than ever before but finding a reward almost unique in their school experience. Most students enjoyed the chance to reason closely and arrive at answers they did not already know. The girls found that they were on the same footing with the boys because the course was not based on the man's world of machines and gadgets. Laboratory work was more than mere confirmation of values or laws already known. The films showed physicists and teachers as normal human beings, talking respectfully and with interest about the subject matter and apparatus in the course. The teacher's guide, with the films, helped the teachers over the rough spots, the new material and problems, the new approach to the laboratory work, the little techniques for leading the students into productive channels of thought and analysis. Without the teacher's guide, the second test year, with its wide diversity of teachers and students, would not have been so successful.

On the whole, experience with the PSSC program was overwhelmingly favorable, for only about twelve of last year's teachers have rejected the course. A few others have shifted schools, but 250 of last year's teachers are giving the course again in 1959-60. Another 350 teachers, participants in Summer Institutes or In-Service Institutes, have joined the program, making a total of 600 schools and about 20,000 students for this year.

The subject matter included in the PSSC program is not unique. It does represent the carefully considered choice of a thoroughly competent group of college physicists and high school physics teachers. In defining the course, they had definite objectives in mind and chose topics to support these objectives.

The major lessons to be learned from the whole PSSC program fall in another category. They present us with strong evidence that: (a) High school teachers and college teachers can work together, and the experience is stimulating to both; (b) Subject matter revision should be made by practicing specialists in a field (in this instance college, university and industrial physicists); (c) High school students will respond to an intellectual

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O. L. Davis, Jr.

Children Can Learn Complex Concepts

Curriculum research must attend not simply to what children know but to what they can learn at certain stages of growth.

DEVELOPING adequate concepts is a matter receiving increased attention by those who teach. This concern for meaning is no new phenomenon, for educators have long deplored the learning of unrelated facts and ideas and the superficiality of verbalism.

What teacher has not observed, and occasionally been disheartened by, the misconceptions evidenced by his pupils? "I pledge a legion to the United States and to the Republicans. . . ." Often the objects of humorous comment, misconceptions and misunderstandings are also cited as evidence of children's inability to conceptualize. The more numerous the "mistakes" and the more frequently these "mistakes" are made, it is argued, the lower the level of one's ability to deal with more complex relationships.

All elements of the curriculum require children and youth to deal with concepts. In some areas, the ability to handle concepts is of major importance. The social studies is such an area. The nature of much social studies materials is such that it must be learned about rather than learned through actual experiencing. Instruction and learning in this field, therefore, are highly verbal. Reading, writing, speaking, and viewing comprise the major categories of activities for pupils in the social studies. Whether in the classroom or on a field trip, whether studying a current city charter movement or the organization of the Zollverein, the principal learning medium is words. The basic instructional materials are essentially verbal materials.

Since social studies learnings are highly verbal, the development of accurate concepts is a difficult element of instruction. This difficulty, in part, may be ascribed to the social studies' relative remoteness from the present concerns and active experiences of the learners.

Many social studies concepts are rather definite, such as hour, week, and league of land, yet even these have sub-

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tleties of meaning which are not readily apparent. Indefinite and not clearly defined concepts, such as justice, territory, Indians, and the Legionnaires, constitute a large grouping. A number of authorities in the elementary school social studies curriculum maintain that too many concepts are presented too soon to pupils. By this they mean that the immaturity of the child does not permit his development of clear concepts. Also, they hold that insufficient time is allotted to the important and slow procedure of concept building. To the concept load and to the early introduction of many concepts are attributed the ills of misconceptions, undesirable stereotypes, confusion, errors in thinking, and misinterpretations. Certainly, without adequate underlying meanings, learning is characterized as "verbalism," centering on the superficiality of words, rather than on the ideas they represent.

Children's misconceptions of meanings which are considered elements of the social studies programs have received considerable attention by researchers. In their classic study, Scott and Myers (13) reported many inaccuracies in historical and geographic ideas. They found, for example, almost half of the children tested who could name two explorers but who were unable to tell what was meant by "an explorer." Horn (6: 142-45) cites several examples of the shortcomings of children's concepts in this field. Studies such as those by Hart (5), Lord (9), Jersild (7), and Friedman (4) add to the accumulation of evidence that many children do not have a firm grasp of various social studies concepts.

Most of the research in the nature and development of social studies concepts was conducted over twenty years ago. This research centered primarily on status and genetic studies. Answers were sought to the questions: What concepts do children possess at certain ages? How do these concepts develop?

Many of the studies concluded that since children at certain age levels did not understand some concepts, instruction about them should be deferred until the children had matured sufficiently to profit from teaching. A deferment theory of instruction developed, substantiated by studies of misconceptions and of the growth of concepts, which influenced curriculum development to a considerable extent. Introduction of some social studies topics, formerly taught at early grade levels, was postponed to later grades. It is noteworthy to observe that little experimental evidence has been presented to bolster this theory of delayed teaching.

Need for New Research

For effective learning, the curriculum must be geared to the growth and development of children. Two basic questions must be faced in acknowledging this principle for curriculum planning. What concepts should children be encouraged and given opportunities to develop at the various stages of schooling? When are a child's concepts developed to the extent that instruction is profitable to him? These questions are related.

Attempts to provide answers to these problems must not be limited, as most investigations in the past have been, to determining what meanings and misconceptions children possess. Serious attention must be concentrated on the basic curriculum research problem of determining what concepts children *can develop* when they are guided into rich and meaningful experiences. Such a research orientation takes into account the vast and fundamental changes in society

which constantly occur and the implications of these changes for children's conceptualizing. The need is paramount for experimental research about the development of children's concepts.

Geographical Time Zones

Time and space concepts are two which have been greatly affected by the deferment doctrine. Along with instruction in a number of other ideas related to these concepts, study of geographical time zones frequently has been postponed in the belief that such delay was psychologically sound and educationally wise.

Most authorities in the elementary school social studies agree that learning about geographic time zones is too difficult for children until late in their elementary schooling. Wesley and Adams state the position in unequivocal terms. "It is a waste of time and effort to try to teach these involved concepts relating to the sphericity of the earth before Grade VI or VII" (15: 307-308). They maintain that the difficult concept of the earth's sphericity is responsible for the failure of children to understand zones, dateline, longitude and latitude. They believe that only the process of maturation will enable children to gain these meanings. Other authorities insist that children have no need to know some of these concepts (1, 10). Yet, this reservation does not deny the importance of the concepts and the necessity for teaching them at a later time in school.

Little agreement, however, exists as to the appropriate time to begin instruction about time zones. It is commonly held that instruction should be deferred at least until grade six. Some authorities have advocated that these concepts be postponed even later.

Generally, those holding a theory of deferment cite studies of children's lack of understanding of direction, map reading, orientation, and related ideas to substantiate their position. Inferences are also drawn from children's understandings of other elements of time and space concepts to support deferred grade placement of time zone ideas. Reference is sometimes made, in this regard, to Pistor's study (11) which cast doubt on the utility of beginning instruction in chronology earlier than grade six.

As with other concepts of time and space, little classroom experimentation has been reported which indicates that children can or can not profit from instruction about time zones. Some has been reported, but it is fragmentary and inconclusive. Walker (14) found that seven- and eight-year-olds could functionally understand elementary earth-solar system relationships. Kelton and Hotchkiss (8) were enthusiastic about their efforts to teach direction, longitude and latitude, and map reading to fourth graders. Wilson (16) reported that her attempt to teach these ideas at this grade level was unsuccessful. Schaeffer (12), while believing a unit on time measurement was generally successful with her fourth-graders, noted the difficulty of calendar development and standard time. That children of junior high school age can learn the concept of the sphericity of the earth is indicated by Forsyth's landmark study (3).

An Experiment in Learning

A recent experimental study (2) indicates that children in the intermediate grades can profit from instruction about geographical time zones. Six classes, two at each of the fourth, fifth, and sixth grade levels, chosen from six different

Davidson County, Tennessee, public elementary schools, were used in this study. One class at each grade level was designated as the experimental section and the other class served as the control group. As far as could be determined, none of the classes had had prior instruction about time zones. Prior to the beginning of the experiment, the experimental and control classes did not differ significantly with respect to their mean intelligence quotients, social studies achievement, and understanding of time zones.[1] Significant differences between grade levels were what were anticipated.

The experimental classes were taught a unit specifically embodying material relating to the development of an understanding of geographic time zones during their regular social studies period.[2] The experimenter taught the unit to control for variations in teaching method, learning materials, and subject matter presented. The length of instruction was approximately 30 minutes per day for 14 class days during a three-weeks period. The control classes received no instruction about geographical time zones except that which was a part of the normal program of studies.

The criterion measure of time zone learnings was composed of items relating to direction, rotation of the earth, clock time, the International Date Line, and standard time zones in the United States and the world. Various map projections and real and imaginary maps were included in the test. Satisfactory reliability and validity were demonstrated. This test was administered prior to teaching the unit, at the conclusion of the unit, and one month after concluding the unit.

An analysis of results indicated that all experimental classes significantly profited from instruction about geographic time zones. At all points of development tested, sixth graders demonstrated significantly better understanding than fifth and fourth graders, and fifth graders had significantly higher comprehension than fourth graders. Such achievement is what reasonably should have been expected. Fourth graders gained significantly more understanding as a result of instruction than did sixth graders.[3] All classes that had instruction gained significantly and equally well from the beginning of the experiment to the test of delayed recall and continued their significant gain of understanding following termination of instruction.

Concepts and the Curriculum

The experiment reviewed indicates that instruction about time zones is profitable earlier than was formerly thought possible. These results raise serious questions concerning social studies theory which advocates deferment of these concepts. If this study is indicative of possible findings in other areas of concept development, the deferment theory may have to be modified radically. Much additional experimentation must be conducted in order that curriculum workers may have substantial and realistic evidence with which to make decisions about what should be included in the instructional program and when it is to be taught.

The importance of maturation is in no way minimized by the findings and

[1] All data were treated statistically by analysis of variance, and, where appropriate, t-tests. The .05 level of significance was used throughout.

[2] Some details of these lessons are included in an appendix to the original study.

[3] This finding may have been due to limitations of the criterion test, the upper limits of which may not have been high enough.

interpretation of the study reviewed. Rather, it is believed that beginnings of development must be made and that advances in concept development make possible further learning. More rapid learning may be possible at later ages, but additional and allied learnings may be possible if instruction is begun earlier, utilizing the experiental base which the child has at that time. Maturation is not sufficient to guarantee concept development.

A child will not learn the most intricate subtleties of most concepts, but he may be able to learn something about them. That his understanding may be incomplete is no cause for complaint and no justification for deferment. There is reason, however, for serious attention to be given to the level of meaning he has attained and for careful selection of experiences which will stimulate his continued growth.

Rigid assignment of concepts to particular grade levels probably is impossible and certainly undesirable. Provision should be made for opportunities for the sequential development of concepts throughout the curriculum. Continuity, and not "complete" mastery, is an essential element of all instructional plans. Instruction about concepts should be planned as integral portions of the ongoing school program. The plans, however, should not be allowed to crystallize into separate units taught at specified times. Flexibility and possibilities for meaningful reinforcement of understanding should also be included in such plans.

Curriculum planning to guide the growth of concepts must consider carefully the experiences of present-day children living in a rapidly changing world. Modern transportation and communication may well make distant places and remote occurrences more familiar at times than are happenings nearer home. Television viewing and travel are but two types of experiences which stimulate interests and give meanings, knowledge and skills to young children earlier than was thought possible a generation ago.

The school has an unprecedented opportunity to enrich, extend and guide the growth of the concepts which children experience daily. A curriculum which overly concentrates on the here and now and is primarily committed to a logical extension of horizons according to expanding geographic areas may, in fact, be unrealistic. Such a program might conceivably restrict children's learnings unduly, limiting children to experiences which are no longer exciting, and ruling out possibilities of rich school experiences to deepen and broaden social studies meanings.

Heightened concern and an experimental approach to the development of children's concepts should presage marked changes, not only in the social studies, but in all areas of the curriculum. The major question in this attention to concepts must not be, "What do children know?" but rather, "What can children learn?" This difference in focus should point the direction toward a more adequate understanding of concept development and the relation of instruction to the acquisition of concepts.

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(Continued from page 136)

ence does not exist, neither the funds nor the organization can accomplish much.

While the great general purpose foundations certainly are influenced by one another, the variations among them in policy and problem area emphasis are appreciable. The burden of the argument of this short introductory piece is that within these variations, and with special reference to educational practice, the foundations should try to differentiate sharply between supporting research and experimentation, on the one hand, and promoting a favored solution to an educational problem, on the other. When the foundations do the latter they may not be betraying a public trust, exactly, but they can expect that their carefully developed reputations for objectivity and disinterestedness will be attacked vigorously by men and women with different favored solutions but less money to support them.

A LETTER from John Rowe

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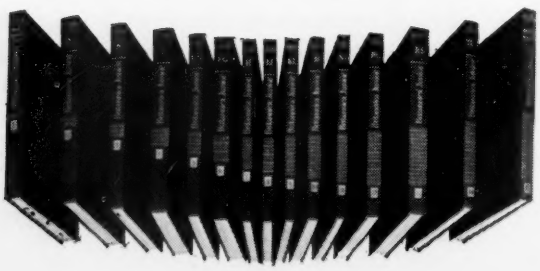

The Importance of People

Column Editor: Fred T. Wilhelms

Wanted: A Peacetime Induction System

IF YOU had to deal with high school boys during the war, you know that they were terribly eager and anxious about their entry into the armed forces. That one looming fact colored all their thinking. I recall that while I was with the National Association of Secondary-School Principals we published a little guide called, "Getting Ready for Induction," and we could hardly keep up with the urgent demand for it. Our nation had a very efficient induction system for the boys in those days, when we knew how badly we needed them.

It's all less spectacular today. But, 'way down underneath, high school boys—and girls—are probably just as eager and anxious now about their entry into adult life. Only, where is the induction system? Where is the guide?

Initiating the Young

Is it unfair to estimate that among all nations of all times we may have the poorest system of progressively incorporating our youth into the world of the adult? Primitive tribes take very seriously their initiation rites—and even these are only symbols of an assimilation that has been going steadily forward through the years. Agricultural communities gather their youth into the adult circle as steadily and as naturally as season follows season. Among the poorer nations, the sober realities of need place responsibility—and with it status—upon the newly-strong shoulders of youth and maiden. Every one of the totalitarian nations has consciously capitalized upon the powers of its young people.

And we? Are we not almost saying aloud, "Run along and play awhile"? Or, at best, "Study your lessons like nice children; we'll see you later." And when some vigorous youngsters grow restive or make a nuisance of themselves, are we not chiefly diagnosing them as needing more facilities for recreation—which we then proceed to build *for them*? We seem scarcely to consider their possible need for work, for responsibility, and for the status which goes with making a contribution. Even less, except within some families, do we genuinely incorporate them into the council circles of adults, to be heard when decisions are made.

Maybe—just maybe—this is a root cause of that profoundly disturbing alienation of the adolescent subculture from the adult world, which appears to be growing by the year. Maybe not, for this is only hypothesis. But Heaven knows we need *some* rational explanation when

delinquency rates double in a decade, when juvenile crime is multiplied by eight in ten years, and when study after study, such as those reported by Jacob, shows even our college graduates turning their backs upon the problems of the larger community. It is silly to act as if such a groundswell just happens. It is produced.

A Need To Be Counted

In other times and in other cultures 16-year-olds have done sober work, sat among men and women, and counted. We have tended to pity them—and certainly we are fortunate that we can release our children from harsh, grinding labor, that we can afford them time to build themselves toward rich, productive lives; just as certainly our motives are kindly. But has it been only harsh necessity that moved adolescents into adult affairs? Or have those other cultures—including our own not so long ago—been closer-tuned than we are to deep-lying, almost-instinctual drives and aspirations that grow in young people as naturally as their bodies grow into the greatest vigor they will ever know?

Put it bluntly: In our scheme of things, are we bucking against irresistible surges of inchoate, half-recognized aspirations rooted in the very nature of a human being? In virtually attempting to hold a big human being in the role of the "little," are we *outraging the organism*—and harvesting inevitable defiance? We all know the fiercely awkward battle any healthy adolescent puts up for independence from his family; is that all there is to it? Is he not announcing that he means to be a man? We all know how even an infant rages when his arms are held down; the blind rage implicit behind today's lightning flashes of youthful violence—is it, perhaps, akin to the infant's struggle to be let loose?

Certainly adolescents love vigorous play; and it is good for them. But is that *all* they love, and is it *all* that is good for them? It is easy to see youth, in the herd, as merely frivolous; for the frivolity, thank goodness, is there. But in the intimate view the near-young-man and the near-young-woman are the most idealistic persons left in this tired, compromising, old world. They yearn—whether they know it or not—they yearn for something significant to do, for responsibility, for a place in the circle.

And we have shut them out. Oh, they can get hold of an old car, soup it up, and drive off to the drag races. They can start smoking cigarettes. But that is about all the adultness we let them have. And then when, having no responsibility, they act irresponsibly, that is what we look at—and scold.

They are trapped; forced to be little when they know they could be big—when in cold fact only playing the big role can enable them to mature. It is not so bad for the serious college-bound and profession-bound among them. Their goal may be long deferred, and they may squirm with impatience; but they can see that they are doing something important just in getting ready, and their days have something—not enough, but something—of function. But all too many of the others see no real connection between what they do in school or out of it and their ultimate life. They see no real contribution this day's activity is making. They are only marking time. For them, today is an emptiness and they are a nothing.

And we are trapped, too, we school people. We have to live with these caged tigers, in quarters that give us precious little room to exercise them. Even if we

all united it would be hard to get public permission to give them greater life space. And the question of what we ought to do is so complex that we are not likely to unite.

A Rising Line

But we delude ourselves if we believe that we shall produce maturity out of a diet of immaturity. We have no real alternative. We must supply young people the makings of maturity. And we are not hopelessly without recourse.

Even within the space we ourselves control, opportunities lie largely unused to move youngsters up a rising line of work, responsibility, and status. Let a tiny example stand for the whole: Coaches don't really have to tend to the athletic equipment and make the training rules; the boys are big enough to do it. Look at a good kindergarten and see how large a thoughtful share of responsibility these tots carry in proportion to their development; if we could maintain that proportion through the senior year, what could our schools not do?

And we could be moving out into the community. Every community denies itself services and facilities it needs, on the grounds that it cannot afford them. A survey in my home city revealed a pressing need for child-care facilities, especially for the children from one-parent homes, where that parent must work. What could serve better to produce in adolescents the sense of responsible "bigness"—which they yearn for, and which society needs in them—than to help care for those children? Perhaps, viewed only financially, teen-age volunteer service will always be a modest factor. But the willingness of the volunteers will not be the bottle neck. The San Francisco Youth Association has built up a sketchy system for getting youthful volunteers into service. It depends almost entirely on the initiative of the youngsters. Yet it has never failed to provide more volunteers than the agencies had the ingenuity to use—and they have made a splendid record. The possibilities are infinitely great.

But we shall have to go further. Ultimately we must raise the radical question: whether our pattern of full-time academic preparation till one moment, full-time adult role after that moment, *is* fundamentally sound. It is a dismaying question, dragging in train a host of complexities woven into our whole social and economic fabric. Anyone who has the nerve to raise it among practical schoolmen learns speedily about a spate of real problems.

And yet the thing to do is to look the question in the eye, and go after the answer with all the help we can get. It is always a mistake to get bogged down too soon and too compromisingly in the complexities of ways and means. We *always* find ways and means when we want them badly enough.

Right now the need is for diagnosis. Is the hypothesis set out above truly valid? Have we alienated adolescents by closing too many doors in their faces? Have we fallen so far behind their development that we keep them children when all their drive is to be young men and women? Are we flying in the face of Nature? If so, no amount of little tinkering will solve the problem. We have got to get back in tune with what people really are.

—Fred T. Wilhelms, *professor of education, San Francisco State College, California.*

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Curriculum News

Column Editor: Paul R. Klohr

AS YOUR column editor reflects on this month's theme, "Projects That Will Influence Instruction," and attempts to select significant news items, he is again impressed with the urgent need for a clearer, more widely shared rationale for curriculum development and instruction. Without this, an intelligent reporting or a meaningful appraisal of the many things under way seems doubtful.

In early September the press in many parts of the nation reported items of this tenor: "A ferment of fresh ideas—on curriculum patterns, teaching methods, special classes, use of teachers and facilities—is bubbling in the nation's classrooms as 40 million youngsters head back to school." Then there would follow a listing of "new developments"—electronic teaching machines, teacher aides, foreign language classes for young children, intensified mathematics and science programs, advanced placement, teaching teams, extended school days, honors classes—to name a few.

In December, as one looks in on this "bubbling" and asks the teachers involved, "How is it going?" the response leaves him with the feeling that really very few know. The critical questions to be answered in the "new developments" often seem not to have been raised, and the goal-values sought seem not yet to have been formulated.

Should these activities be reported as significant experimentation? How shall one describe the underlying rationale? Through indiscriminate reporting, do we help to chart trends which schools will follow blindly in their attempts to modify programs under increasing pressure?

At the Cincinnati conference last spring, L. D. Haskew urged curriculum leaders to give careful and continuous attention to purposes, goals, values and direction lest action become an end in itself. His wise counsel is pertinent.

We need more than ever new approaches to the analysis of curriculum problems, approaches which help to identify the major questions and issues underlying various alternatives for action. There comes to mind the insightful analysis Finley Carpenter made in the April 1959 issue of the University of Michigan School of Education *Bulletin* in his brief article, "Can the Argument About Pupil Grouping Be Resolved?" A second example of a different kind is the list of questions raised by the group studying the use of a language laboratory at the Pascack Valley Regional High School, Hillsdale, New Jersey. Louis Albini reports these in the June 1959 issue of the *Secondary School Bulletin* of the New Jersey State Department of Education.

This persistent need on the national curriculum scene again points to a major task for ASCD's Cooperative Action Program for Curriculum Improvement.

The November 25-28 meeting of the National Council for the Social Studies included three assemblies geared to the topic, "Specific Changes Which Need To Be Made in the Social Studies Curriculum." Group meetings following these assemblies studied in detail the suggestions made. Howard H. Cummings, president of NCSS, identified one major problem which must be faced in efforts to reorganize the social studies curriculum when he said, "Although the social studies make up a major portion of the education of the average American before he goes to college, unlike science, mathematics, and modern language, it cannot look forward to heavy government subsidies and in the recent past has received no substantial foundation support."

The National Science Foundation plans to announce in March the colleges and universities which will offer in-service institutes during 1960-61 for secondary school science and mathematics teachers. Approximately 10,000 teachers in these fields will participate in such after-hours training. These institutes are designed primarily to assist colleges and universities to encourage teachers in local and outlying school districts to take advantage of scientific training facilities not otherwise available to them. Institute meetings will be held on evenings, Saturdays, or late afternoons so that teachers may attend while still teaching full time in their schools.

The Division of Curriculum and Instruction of the New Jersey Department of Education reports an example of cooperative effort on the part of elementary and secondary schools to improve curriculum through a pilot study in the Lower Camden County Regional District. Begun in 1957, this project is concerned with more effective methods of articulation in the region which has 2 six-year high schools and 22 elementary schools. A curriculum coordinator heads a Planning Committee made up of the county superintendent, principals of the elementary and secondary schools, helping teachers, and the regional superintendent. Among the significant activities undertaken are: the establishment of a textbook and materials center, the publication of a curriculum bulletin, teacher visitation programs, uniform cumulative records, and the development of a common K-12 philosophy of education.

Although those involved admit that their work is only a beginning, some outcomes of the project as expressed by participants are: "A recognition that the organization has served as a vehicle for aiding in the solution of common problems; that the project has improved articulation between elementary and secondary schools by giving administrators and teachers greater insight into the educational program from kindergarten through the twelfth grade; that the office of the curriculum coordinator, which serves as a coordinating element and clearinghouse, is extremely valuable."

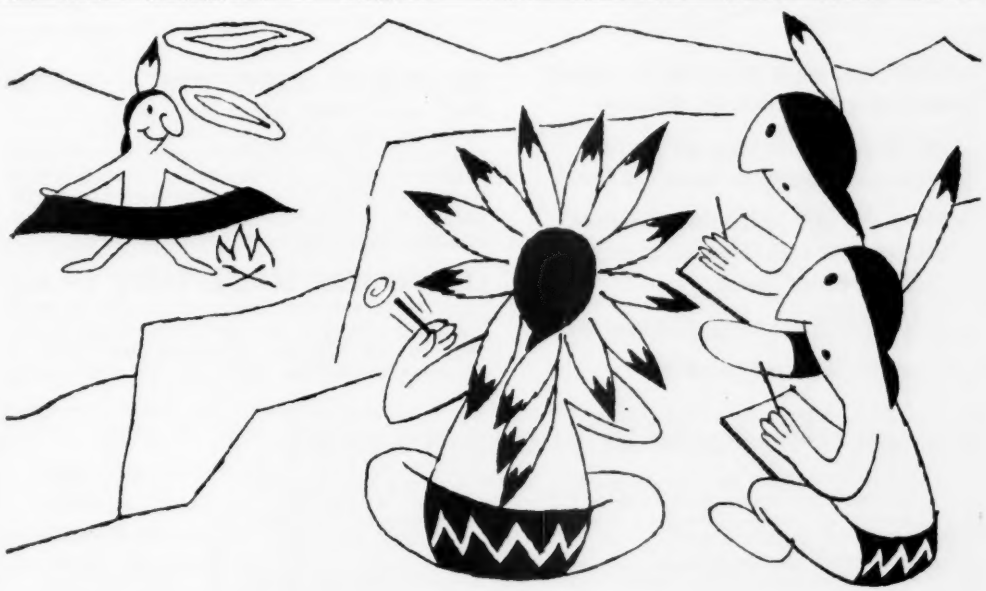
A new color filmstrip, "Methods of Organizing Economic Activity," adaptable for high school social studies classes, demonstrates a significant approach to the development of curriculum resources. It is based on materials which grew out of an experimental economics class at the laboratory school of the University of Illinois. The high school students, themselves, took an active part in the preparation of the filmstrip, which is available with script and teaching suggestions from University High School, Urbana, Illinois.

Thomas R. Landry, director of elementary education in the Louisiana State Department of Education, reports a

study he has made of what supervisors and selected authorities think about supervision. Participating in the study were 110 Louisiana supervisors of instruction and 23 key persons in the field of supervision who responded to an opinion ballot of 48 items. Landry concludes that the Louisiana supervisors and the selected authorities are in close agreement on a majority of the items included in the poll. The two groups agreed, for example, that good supervisory practices include furnishing leadership in organizing study groups, helping the principal to supervise more effectively, keeping informed about research findings and making these findings and interpretations available, and recognizing the need for continuous planning, action, and evaluation.

This year marks the third and final phase of the ten-year campaign of the National Citizens Council for Better Schools to arouse interest in public education and to inform the public about its schools. The Council, organized in 1956, took over the work of the earlier National Citizens Commission for the Public Schools. According to Henry Toy, Jr., president, the national group will begin to serve more directly as a clearinghouse to supply printed materials for the use of state and local groups working for school improvement. To focus more fully on this task, some services such as the regional offices in Minneapolis, Denver, Louisville, and Brownsville, Texas, have been discontinued as has been the publication of the monthly "Better Schools." One feature of this shift in emphasis has been the preparation of a new pamphlet series, the first of which was "Yardsticks for Public Schools."

—PAUL R. KLOHR, *assistant dean, College of Education, The Ohio State University, Columbus.*



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Curriculum Bulletins

Column Editor: Arthur Hoppe

NOTE: Various faculty members of the School of Education at Indiana University have assisted the column editor by appraising materials in their respective fields: Ruth Strickland in elementary language arts; Emily Huntting in homemaking; Fred Mills in art education; Leo Fay in elementary reading; and Prevo Whitaker in science.

Des Moines Public Schools. *Communication Skills: Listening, Speaking, Writing.* Des Moines: Department of Elementary Education, August 1958, 58 p. ($2.25)

The Elementary Language Committee sought information for their guide from schools in 43 cities comparable to Des Moines in size and from all of the elementary teachers in Des Moines. The results show many good suggestions for teaching certain communication skills, with an up-to-date approach especially in relation to grammar. Basic goals are set forth and succinct explanations of each skill are offered in the bulletin, plus many activities to facilitate learning each one. Suggestions to pupils themselves constitute a conspicuous feature of the guide. Several good questions and suggestions are available here to guide evaluation by the teacher himself and by teacher and pupil working cooperatively. Many examples of pupil products appropriate to this age group are to be found in the section on writing.

The handbook was designed to give security to beginning teachers and to encourage the creative teaching of more experienced teachers. In order to prevent the possibility that this guide might set a rigid pattern for teaching communication skills, or mold the teaching of language skills for years to come, it has a built-in feature: a section at the end calling for comments and suggestions for improving the bulletin by teachers who use it. It would be well if more of our curriculum material included such a device.

Florida State Department of Education. *Florida Homemaking Education.* Bulletin No. 23. Tallahassee: the Department. Revised 1955, 243 p. (No price indicated.)

Many teachers, representing all areas of the state, worked with supervisors and consultants for a long period of time to produce this bulletin. The product proves the excellence of their work. This guide for homemaking in grades 7-12 was done in scholarly fashion. It is presented in unique format, with interesting use of line, form, space and color.

The guide begins with careful statements of philosophy held by the Florida homemaking teachers, objectives for work in their field and many methods of teaching and evaluation. A two-page scope and sequence chart shows a skeleton of the content for all the secondary

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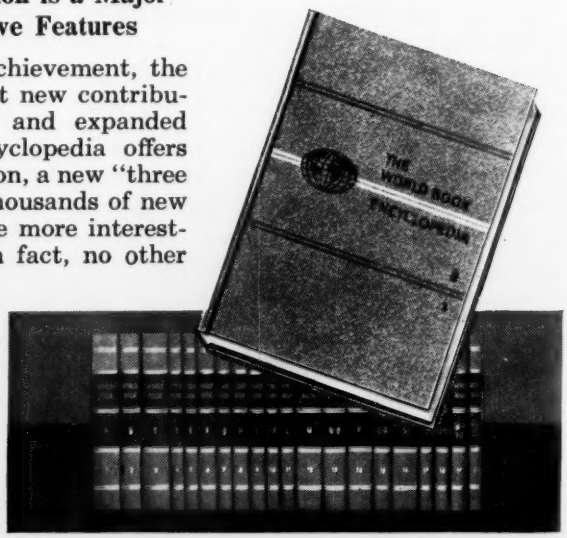


school grades. The program is family centered and the key questions for guiding learning experiences are the very ones youngsters do and should raise about problems of a personal and family nature. The problems increase in complexity from year to year, as do also the suggested content and resources—reflecting desirable growth from year to year.

Many suggested activities are presented and many teaching aids, particularly pamphlets, films and filmstrips. The guide contains clear, concise and convincing explanations of the use of this material by teachers.

Maryland State Department of Education. *Art in Our Maryland Schools.* Baltimore: the Department, 1954, 48 p. (No price indicated.)

Through a large variety of well chosen photographs and a minimum of words, the compilers of this guide have highlighted their basic beliefs about art in the daily lives of learners. The scenes chosen are vivid and fascinating; the remarks are succinct. Both require thoughtful interpretation, but they leave the teacher relatively free to adapt the materials to particular groups and purposes. It pictures the meanings of art, the necessary atmosphere and the elements of art, the different goals and motivations of art, the purposes and potentialities of art for boys and girls in school.

Art is presented as an important vehicle for interpretation of surroundings, for working independently, for satisfying curiosity, for solving personal problems. Great freedom of ideas is expressed while at the same time the guide points out where students may get leads to art experiences. Many examples of student work are shown for the reader's interest. On the whole, the guide is in good format, contains sound philosophy and workable suggestions for its implementation, and should prove highly useful to teachers.

Minneapolis Public Schools. *Reading Readiness in Kindergarten and First Grade,* (a Supplement to the Guide to Teaching Reading in the Elementary Schools). Minneapolis: the Schools, 1956. 108 p. (No price indicated.)

Both teachers and parents in Minneapolis sought specific information on reading readiness, particularly on the relationship between reading readiness and child growth characteristics. This handbook was designed to fill the gap. It was developed by a committee of kindergarten and first grade teachers, principals and consultants.

The handbooks began with a brief but clear description of important theories of readiness for reading. It goes on to suggest important needs of young children related to love, security, discipline, responsibility and patience, and the critical role of parents in ministering to these needs. Part III and especially Part IV present in much detail the contribution of the kindergarten and of the first grade, respectively, to reading readiness. They offer a great wealth of activities through which readiness for reading may be promoted. Sample schedules for entire school days are included. Finally, many practical suggestions are made for the evaluation of developing readiness to read.

The parts are separated by interesting color pages and there are numerous clever drawings throughout the guide. It is a thoroughly pleasing and useful work.

—Arthur Hoppe, *associate professor of education, Indiana University, Bloomington.*

Parlons Français

(Continued from page 152)

one of three years of televised courses for teachers and children which are ultimately to be filmed in a final form after appropriate revisions of program content and presentation. This work is a very exciting prospect for all involved in the project, for the programs will thus be available on a national basis. It is planned to have a whole package for a year's course of films, guides and recordings. We are also hoping that material filmed in France will add authenticity not otherwise attainable.

In conclusion, a word about the research which will be made on the program. Since this project is experimenting in somewhat new fields, the federal government, in considering the original research proposal entailing funds under Title VII of the National Defense Education Act, requested that the research design be made even more thorough and extensive. Forty-eight fourth grade classes have been selected from ten suburban school systems in the Boston metropolitan area in communities which are not bilingual and with teachers selected on the basis of experience and interest in the project. The research design proposes to compare the effectiveness of several combinations of televised teacher-training and direct instruction in oral French upon the achievement in listening and speaking skills of fourth grade children. Tests are being administered to teachers at the beginning and the end of the school year, while the children will be tested only after the programs are over, on the assumption that a minimum percentage of children are already bilingual. In view of the critical need for teachers of foreign languages at the elementary level, the results of this research should provide some definite information on in-service teacher training and on the success of the combination of expert TV teacher and elementary classroom teacher.

Mathematics Teaching

(Continued from page 166)

in the branches of mathematics called 'set theory' and 'foundations'. We use them because they enable students to see more readily the connections between manipulative procedures such as equation-solving and graphing and the structure of the number system. But, whether an abstraction is a twentieth-century one or one known to the Pythagoreans, our working rule is that students need to develop an awareness of it, symbolize it, and then invent mechanical procedures for manipulating the symbol.

In ending this discussion I must point out that our attempt to get students to see that mathematics is an intellectual subject should not be misconstrued as an attempt to have students deal only with ideas and to eliminate manipulative drill. Drill is absolutely essential in developing skills, and students must be skillful computers in order to work effectively with ideas.

Curriculum Research

Column Editor: Walter B. Waetjen

Contributor: Gordon P. Liddle

An Experimental Program for Slow Learning Adolescents[1]

A STUDY of the "problem adolescents" (delinquents, school failures, dropouts, and discipline cases) in a Midwestern community of 45,000 revealed that they were often nonachieving children with IQ's in the 75-89 range, children we designate as slow learners.

From an eighth grade population of 470, 61 children with IQ's in this range who were also doing below "C" work in their academic subjects were selected for an action research experiment. Two-thirds of these 61 children were put into a special curriculum with two selected teachers for an experimental period of two years, while the remaining 20 children stayed in regular classrooms. Achievement and adjustment measures were taken before and after this period, and process data were collected through records of teacher observations, observations by clinical observers, interviews with the students, and questionnaires.

The perceptions of the school experiences and job adjustments of an older group of dropouts played a major role in designing the school program. We found that this group, most of whom fit our definition of slow learners, had lived in an atmosphere of defeat in almost everything they undertook at home and in the neighborhood as well as at school. Their relationship to their teachers, their classmates, and the curriculum had been painful, particularly after they entered a junior high school in a middle class area. Inflexibility, lack of certain skills, and especially a "chip on the shoulder" attitude had made the transition to the world of work difficult for most slow learner dropouts. It seemed that much of the curriculum for slow learners might well be concerned with the application of the academic skills to practical situations in the work world, rather than with additional content in subject matter areas.

For the group as a whole, attitudinal changes seemed as important as improvement in academic skills. The records of school disciplinarians and the police showed that many of the antisocial attitudes expressed by these adolescents on personality inventories and in interviews were being expressed in antisocial actions.

Through the curriculum our aim was to provide:

[1] This investigation was supported in part by the Moorman Foundation and in part by a research grant from the National Institute of Mental Health, United States Public Health Service.

1. A sustained contact with one or two teachers who were genuinely interested in children of this type. A majority of the school day was to be spent with these teachers, although there would be an opportunity for the students to participate in courses such as chorus, industrial arts, typing, and physical education.

2. Instruction in reading, arithmetic, and oral and written communication was aimed at preparing them for their roles in jobs and in their own homes, through materials that would appeal to them.

3. Maximum use of learning experiences with nonacademic connotations, including role playing, dramatics, field trips to local industries, to see the jobs they would hold in a few years, part-time work experience for interested students, ordering from mail order catalogs, and reading such things as directions for applying enamel or operating instructions for a power drill.

4. A relaxed, informal class atmosphere aimed at encouraging participation by all—little threat of failure or time pressure.

5. Planned opportunities to help students with personal and social problems through group activities and discussions, and, where necessary, referral to treatment agencies.

After two years we compared the 20 slow learners who had been left in regular classes in the usual curriculum with the two groups of 20 children each who had been in the experimental program. Our major findings were as follows:

1. *There was no significant difference in improvement in school achievement.* There was slightly greater progress on the California Achievement Battery among the experimental students. The experimental groups as a whole, however, improved a mean grade placement of only .6 years in two school years. It would seem that the slow learners' maximum level of academic performance had been reached by early high school, and that special classes at the high school level are not likely to improve academic performance significantly.

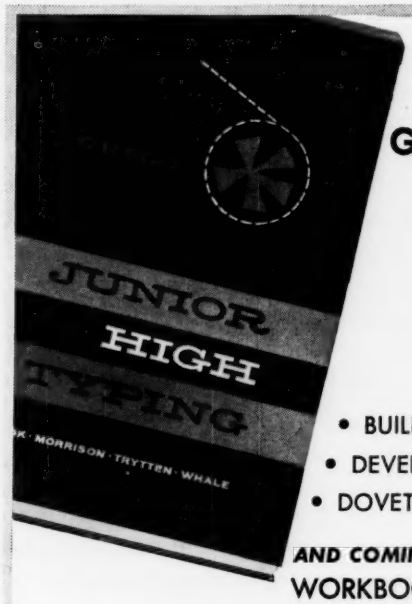
2. *There was significant improvement in attitudes toward school in the experimental group.* There was some labeling of the special class children by their peers (dumb class, etc.). This was not a serious problem, however, after the first few weeks except for two children. Each semester the students could choose to return to regular classes, but only two chose to do this. Periodic written evaluations by the students contained criticisms and suggestions, but were predominantly positive. The improved attitude toward school shown by most of the children during the experiment was observed by all concerned.

These observations are supported by the finding that children in the experimental groups were absent an average of 14 days and were tardy four times during the experimental period, while the children in regular classes missed 27 days and were tardy an average of seven times. The percentage of slow learners who left school during the experiment was not significantly different—53 percent of the controls as compared to 45 percent of the experimental children.

3. *There was a significant decrease in antisocial behavior as seen in both frequency and seriousness of delinquent acts.* During the period of this experiment most of our subjects were in the 15-17 age group, a period of peak delinquency. The number of control group children with court records during the experiment, as opposed to before the experiment, increased 147 percent and the seriousness of their misdemeanors had increased 226 percent. For the experimental group, however, there was only an 11 percent increase in the number with court records and the seriousness index decreased 19 percent.

4. *There was no significant difference in personal adjustment scores.* During the study both control and experimental groups made good improvement in their scores on the California Psychological Inventory. The differences between groups were not significant. In general, girls who dropped out of school to get married or to go to work showed the greatest improvement, and boys who dropped out and did not get jobs became even more disturbed.

Since the norms for the California Psychological Inventory indicate that adults give more "right" answers than do high school students, it seems that much of



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the improvement in personal adjustment shown can be attributed to maturational factors. While those in the experiment felt that the special classes had been responsible for much of the improvement in personal adjustment, the control group improved an equal amount.

As the level of abstractions demanded by the curriculum rises in late grade school and in secondary school, the number of individuals identified as slow or as mentally retarded rises sharply. However, since most of these handicapped individuals are capable of holding a job and raising a family, society no longer labels them as different. Thus by the age of 17, it appears that the worst years are over for the slow learners, even though as a group their personality adjustment is still below average. The slow learner has either made the adjustment to high school or has gotten a job as a wife or a wage earner after leaving school.

Conclusion. A special program in the ninth and tenth grades was fairly successful in improving the social adjustment of an experimental group of slow learners in both the school and the community, while the control group during the same period tended toward a worse social adjustment. Personality and school achievement were not significantly affected, but there are indications that these might be improved by an early elementary program.[2]

—GORDON P. LIDDLE, *assistant professor, Committee on Human Development, University of Chicago, Illinois.*

[2] Reported in "Experimental Room for Slow Learners," by Gordon Liddle and Dale Long, in the *Elementary School Journal*, December 1958, p. 143-49.

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Physics Program

(Continued from page 169)

presentation of subject matter, in which rational thought and analysis are more important than brute force memory; (d) High school teachers, with proper support, can teach subject matter far beyond the limits of what they studied in college; (e) Proper support consists not only of subject matter but of the points of view, attitudes and concepts of the specialists; (f) An exceptionally favorable method for providing this kind of support is through the use of teaching films in which these specialists are the film personalities, seen and heard by the students.

For the fall of 1960, commercial versions of the text will be available. Commercial production of the new kinds of apparatus may take longer because of new manufacturing and procurement problems. Films, examinations, and resource books will be available if the demand warrants it.

Significant Books

Column Editor:
Elizabeth Z. Howard

Contributors:
Bearnice Skeen, John Moldstad

Looking Ahead to Teaching. ***Deobold B. Van Dalen and Robert W. Brittell.*** Boston: Allyn and Bacon, Inc., 1959. 403 p.

The authors of *Looking Ahead to Teaching* designed their book "to give the beginning student in education an up-to-date picture of teaching . . . with information he must have, the working conditions he can expect, and the pressures he must face." This is a formidable task considering the complexity and variety found in the educational systems of the United States. That Van Dalen and Brittell have succeeded is evidenced by their adherence to a basic assumption, by the consistency in their philosophy, and by their selection and organization of content.

The underlying assumption of the authors is "that only those who are best qualified should enter teaching" because the "demands are too great, the results too critical." The role of the teacher, as presented in this book, would tend both to discourage and to encourage the person looking ahead to teaching. After studying this text, only the able and dedicated person would dare teach.

The consistency of the authors in their psychology and philosophy did not prevent their sketching the development of the various aspects of education. The summarization of modern views of children under such topics as "The child as a developing organism," "The child as a receiving organism," "The child as a responding organism," "The child as a unified organism," and "The child as a unique organism," is in harmony with the role of the school and teacher, in such topics as "Perpetuating our way of life," "Building a dynamic society," and "Meeting today's needs." The general objectives of education accepted by the authors were those stated by the Educational Policies Commission.[1] In general, the authors stress the problem-solving, cooperative-planning, unit-organization approach to learning experiences with emphasis upon the importance of democracy in teaching.

The selection and organization of the content for an introduction to the teaching profession seem well done in this text. The book is divided into three parts. Part I, The Profession, ranges from decision to teach, ethics and preparation, to the securing of a position. Part II, The School, discusses the growth, organization, administration and financing of the public schools, with some attention to some controversial issues (purpose, funds, methods, patriotism). Part III,

[1] Educational Policies Commission. *The Purposes of Education in American Democracy.* Washington, D.C.: the National Education Association, 1938.

The Teacher, considers the teacher in relation to the child, to the school, to instruction, to the extensions of teaching, and to the community. An appendix containing a list of professional magazines and a self-rating scale are an integral and useful part of the text. A bibliography contains 263 items. The book is adequately indexed.

The amount of material presented, both generally and specifically, gives the student an over-view of the profession and enough detail in specific areas of professional knowledge to serve him in his professional decision making. He is saved from being confused and overwhelmed because of the excellence of the organization of the content and the frequent summaries.

This book is a comprehensive and useful contribution to the literature introducing the teaching profession. The authors evidently had in mind a semester course. The college instructor and the college student are given a broad introduction to the profession of education through emphasis upon understanding child growth and development, upon high ethical principles and professionalism; through the history of education, school organization, and administration; and through discussions of staff and community relationships and current pressures upon the school.

—Reviewed by BEARNICE SKEEN, *professor of education, Department of Student Teaching, Western Washington College of Education, Bellingham, Washington.*

Administering Audio-Visual Services. ***Carlton W. H. Erickson.*** New York: The Macmillan Company, 1959.

This book has as its primary focal point "the organization of information for the efficient promotion of learning experiences for a fundamental course in the administration of audio-visual services." Although several yearbooks and readers have been written about selected audio-visual administrative roles and functions, Dr. Erickson's volume appears to be the first prepared as a textbook in which all the major aspects of administering audio-visual services are considered in a systematic and integrated manner.

The author depends upon periodical literature and research reported in educational publications for many audio-visual standards and criteria. One of the refreshing aspects of the book, however, is the inclusion of accounts of many personal teaching experiences and observations which insure stimulating and rewarding reading. These teaching and administrative experiences reflect the author's 25 years of contact with audio-visual materials as a science teacher, city director of audio-visual services, school principal, U.S. Navy training aids officer, and university audio-visual center director. As further background for writing the text, the author undertook a 12,000 mile trip visiting city-wide and university audio-visual centers throughout the United States. By including administrative forms, diagrams, and criteria developed by personnel of these nationally recognized audio-visual centers, this becomes not only a valuable graduate textbook but a useful planning guide and handbook for school building audio-visual coordinators and city audio-visual directors, school administrators, and curriculum specialists.

In the opinion of the reviewer, the core of this book includes the chapters on in-service training, acquisition of materials and equipment, ways of facilitating the use of audio-visual materials, and evaluation. It also offers the reader in-

valuable techniques and suggestions for helping teachers to realize the full potential of audio-visual materials. Summaries of tested practices, evaluation forms, check lists and standards which have been successfully used by the 34 audio-visual and instructional materials specialists visited by the author fulfill a recognized need not only of the newly appointed director but also of experienced "old hands" who periodically wish to evaluate their present procedures and programs.

As a background for further discussion, the author begins with an analysis of the four essential roles of the director of audio-visual services, namely, those of executive, supervisor, audio-visual specialist, and equipment technician. Sound working principles for setting up an effective service program also come in for early consideration.

Believing that the successful audio-visual director must possess a penetrating insight into the process of teaching and learning, the author includes a synthesis of learning principles and theories related to motivation, the complexity of learning, transfer of training and the process of discrimination and generalization. He relates these to implications for the use of audio-visual materials. Basic roles that audio-visual materials can play in helping teachers to improve instruction and a set of utilization principles which help the teacher use these materials effectively constitute some of the most valuable suggestions.

Ideas for preparing and defending the budget are always of interest to administrators. Besides reviewing many of the minimum financial standards recommended by state and regional organizations, the author provides nine sample budget tables for various hypothetical school situations.

Erickson devotes a part of his text to aiding the prospective director in setting up a central service headquarters, namely the audio-visual center. Such physical considerations as space needs for the various activities, layout, traffic patterns, storage requests and maintenance suggestions all come in for discussion and recommendations. Developing a system-wide staff organization is also considered.

For those audio-visual directors who are about to expand their services, Erickson discusses patterns for setting up and administering instructional materials collections such as books, maps and globes; photographic and graphic services; radio broadcasting; and closed and open-circuit television.

Lastly, the author offers suggestions as to the role of the audio-visual director in "helping others use good communicative techniques for their own public relations programs on the one hand, and making sure on the other that his own service program in audio-visual methods is adequately understood and supported by all who are concerned."

The "suggested activities" section at the end of each chapter is a valuable feature for all instructors planning to use this as a textbook. The author reports that the majority of these suggested exercises have been tried out during his many years of teaching audio-visual administration classes. They appear to be practical learning experiences which students, working as individuals or in groups, can engage in with profit. As such, they constitute a very worthwhile study and activity guide for the course for which the book is intended as a basic text.

This book makes a definite contribution to the literature.

—*Reviewed by* JOHN MOLDSTAD, *assistant professor of education, Indiana University, Bloomington.*

From the Editor

Projects and Instruction. The plan for this issue grew out of members' questions regarding numerous studies currently under way that are financed by grants. Almost daily, persons in instructional work read or hear about one or more of these projects. What is the aim of the massive study of physics instruction, or of mathematics, or of the life sciences? Will these projects produce text materials? Will these books, or audio-visual materials, or ETV programs be posed for introduction in the elementary or the junior high or the senior high school program?

Our members seemed to be saying: If such are the aims of these projects, then we need to become acquainted with them.

Acting on the queries of our members, and with the suggestions and help of Rodney Tillman, then ASCD executive secretary, a plan was devised.

Several projects, financed by grants from foundations or from government agencies, are described, each by a person or persons closely identified with the project. The issue is introduced by an article that calls attention to a need for school people to keep a wise perspective as they participate and advise in the conduct of these "projects that will influence instruction."

The significance of this selective, yet indicative, approach rests on two points: (a) Persons concerned with instructional improvement need information about any possible new trends, materials, approaches, media or means of instruction; and (b) We need to show friendly, yet not uncritical, interest in all projects, studies or programs in such areas.

Often curriculum workers are inclined to take more or less for granted the form of the so-called "organized bodies of subject matter" that make up so large a portion of the pupils' school experiences. Yet specialists in some of these academic and vocational fields have come to see that effective changes can and should be made in approaches traditionally used in their areas. Adjusting these areas to the needs of the present and the future in a rapidly changing world is likely to be a project that is larger than any one individual, or two, or a school staff or system, or even a state department of education might be able to undertake.

At this point the foundations, some with vast resources, can make a unique contribution. They can furnish adequate means for a sufficient length of time to accomplish such a task, thus somewhat relieving the burden from the tax dollar. A reorganization of a portion of our cultural heritage, a reorientation to an area that is important to our survival and growth as a democratic nation—such an objective has tremendous implications.

We as curriculum workers need to be keenly interested in such endeavors. At the same time we need to renew our own professional commitment to a school program that will continue to enhance learning for the individual and that will represent a deliberate attempt to maintain a balance in the instructional program.

—Robert R. Leeper, *editor*, Educational Leadership.

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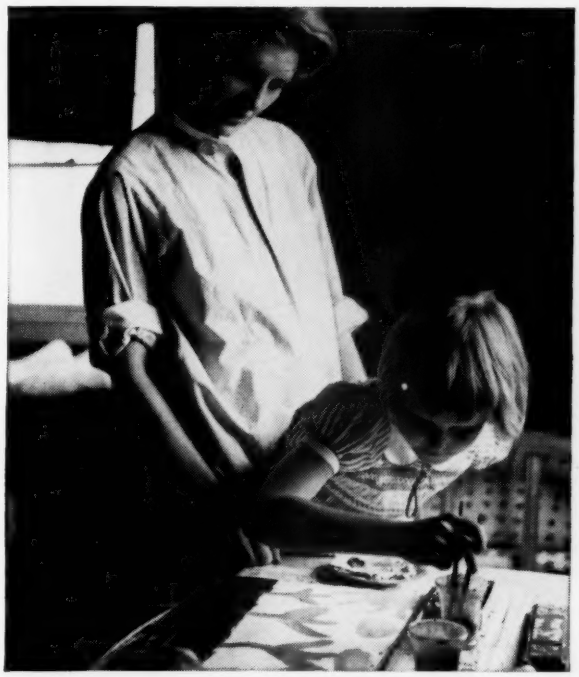

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